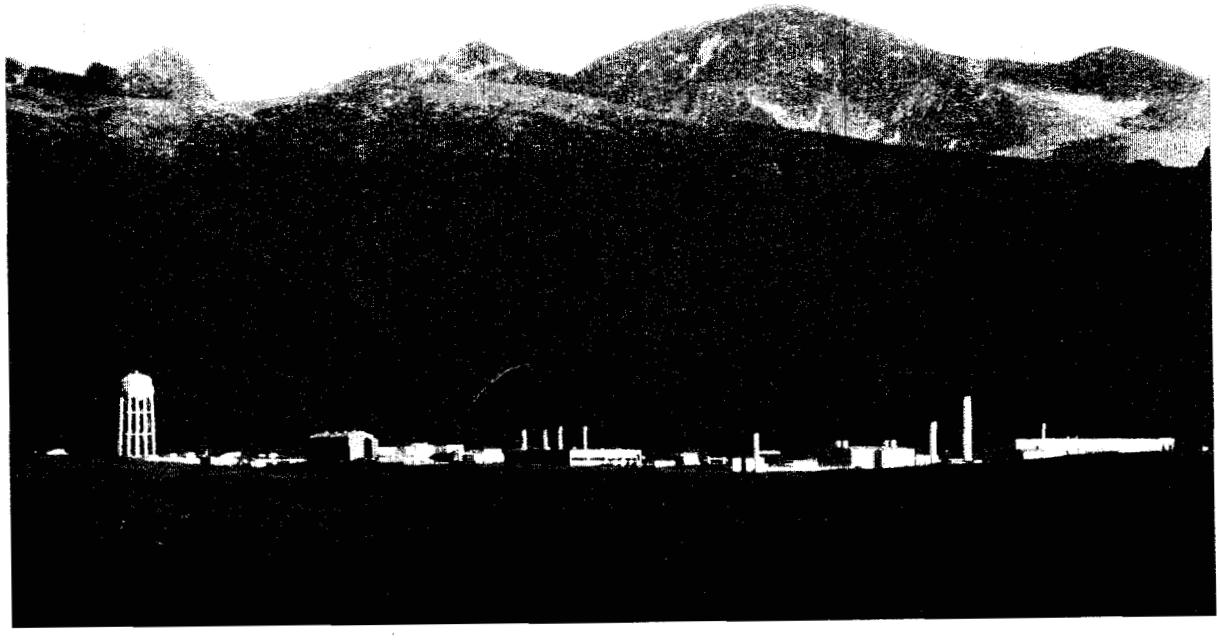
ROCKY FLATS PLANT

FISCAL YEAR 1993
SITE-SPECIFIC PLAN



EG&G ROCKY FLATS

ROCKY FLATS PLANT
FISCAL YEAR 1993
SITE-SPECIFIC PLAN SUMMARY

JANUARY 29, 1993

DISCLAIMER

PREFACE
FISCAL YEAR 1993
SITE-SPECIFIC PLAN

The purpose of this Site-Specific Plan (SSP) is to inform the public regarding environmental restoration and waste management activities at the U.S. Department of Energy (DOE) Rocky Flats Plant, with emphasis on activities planned for fiscal year 1993 (FY93). This plan is based on activities funded by the DOE Environmental Management (EM) organization, as outlined in the DOE Environmental Management Five-Year Plan (FYP), and environmental activities funded by the Defense Programs organization of DOE. The SSP is intended to complement the FYP by highlighting planned activities within a given fiscal year, but it also includes discussions pertaining to environmental restoration and waste management activities funded outside the scope of the FYP (Defense Programs activities). Because of the dynamic nature of the FYP and the federal budget process, budget data within the SSP are not final.

The SSP includes the following: (1) an introduction; (2) a discussion of the site's environmental restoration and waste management activities by category, including corrective activities, environmental restoration and other environmental programs, waste management, and technology development; (3) an explanation of the Rocky Flats' Quality Assurance program; (4) agreements and orders applicable to Rocky Flats; and (5) an overview of the National Environmental Policy Act (NEPA) documentation process.

The FY93 SSP represents the fourth publication of this annual document. Continuing efforts are being made to improve the document, and this year's SSP incorporates format modifications and additional information in response to comments received on the FY91 and FY92 SSPs. Specific comments pertaining to the FY92 SSP are addressed individually in Appendix A. The FY93 SSP also includes detailed environmental and waste management accomplishments from the previous year. For the first time, the SSP includes a discussion of the transition of the plant's focus from resumption of plutonium operations to one of site cleanup, economic development, and national security contingency. It also presents a short discussion in the Waste Management section on residues management.

A public information meeting will be held to solicit public comments on the SSP, and comments and recommendations received during these meetings will be incorporated into a response document that will be provided to the public in mid-1993. Your suggestions and recommendations are strongly encouraged and appreciated. Comments regarding this SSP and the related public meeting may be directed to:

U.S. Department of Energy Rocky Flats Office/FY93 SSP
Beth Brainard, Public Affairs Officer
P.O. Box 928
Golden, Colorado 80402

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1.0 INTRODUCTION

1.1 PURPOSE OF THE FY93 SITE-SPECIFIC PLAN

In March 1989, Secretary of Energy James D. Watkins made a commitment to clean up U.S. Department of Energy (DOE) Weapons Complex sites and bring them into compliance with all applicable environmental laws and regulations. In an effort to fulfill this commitment, the DOE Office of Environmental Management (DOE-EM) was established. This organization was formed to consolidate and spearhead DOE's environmental activities and to increase accountability for identifying and implementing solutions. Environmental restoration and waste management activities at Rocky Flats are managed by the DOE Rocky Flats Office (DOE-RFO) under the guidance of DOE-EM. Most of the activities addressed in the Site-Specific Plan (SSP) are implemented by EG&G Rocky Flats, Inc., the Management and Operating (M&O) Contractor at Rocky Flats.

The purpose of the SSP is to inform the public of environmental restoration and waste management activities at Rocky Flats. The objectives of the SSP are as follows:

- Describe the strategy and activities for environmental restoration, waste management, and technology development programs, with emphasis on FY93
- Foster open communication between DOE and the community
- Demonstrate DOE's emphasis on environmental stewardship and responsible management
- Describe the policies that DOE and its contractors are using to meet environmental restoration and waste management objectives
- Provide a vehicle that can be used to focus public comment on near-term DOE environmental and waste management activities

The SSP emphasizes accomplishments and near-term planned activities, primarily those that will be accomplished in FY93, and reflects current planning, including the impacts of recent agreements and anticipated FY93 funding allocations. The SSP serves to complement the Rocky Flats Five-Year Plan (FYP) for Environmental Restoration, Waste Management, and Technology Development and the DOE National FYP, the foundation of DOE's long-term strategy for environmental restoration and waste management. Public comments on the SSP will be addressed in a comment response document that will be issued in early 1993.

1.2 THE PLANNING PROCESS: HOW THE SSP FITS IN

The DOE-EM planning process for environmental restoration and waste management activities consists primarily of three related documents: the FYP, the SSP, and Roadmap.

1.2.1 The Five-Year Plan

The FYP was the first of the three environmental and waste management planning documents. DOE issued the first edition of the FYP in August 1989. The FY94-FY98 FYP, planned for public release in early FY93, presents information on the current year (FY92), the budget year (FY93), and activities for the subsequent five years (FY94 through FY98).

The FYP is revised annually. The purpose of the FYP is to (1) establish an agenda for cleanup and ongoing waste management operations against which progress will be measured, (2) describe DOE's current strategy and planned activities to meet cleanup and regulatory compliance commitments through FY98, and (3) increase the involvement of other agencies and the public in DOE's planning process. The FYP encompasses all activities and costs for environmental and waste management programs (Corrective Activities, Environmental Restoration, Waste Management, and Technology Development) for Rocky Flats funded by DOE-EM.

Activity Data Sheets (ADSs) are the core of the planning process and constitute the basic framework of the FYP. ADSs fully describe the environmental and waste management activities at Rocky Flats necessary to comply with applicable environmental and health and safety regulations and to pursue the goals of DOE-EM. ADSs include an activity description, milestone schedule, funding requirements by fiscal year, priority rationale, and consequences if the activity is not pursued or fully funded. Estimated funding requirements presented in an ADS are formulated using (1) engineering estimates for capital equipment and construction requirements and (2) functional organization estimates for operating costs, based on both historical and planned efforts. ADSs are compiled to create the Rocky Flats FYP, which is submitted to DOE Headquarters (DOE-HQ), where the Rocky Flats FYP is merged with plans from the other DOE sites into the National FYP.

In FY93, performance against the milestones presented in the ADSs will be measured in a consistent manner for all DOE-EM funded environmental and waste management activities. DOE-HQ is currently implementing a computer-based reporting system to allow progress tracking against milestones and funding analysis for each site.

The reporting format of the FY94-FY98 FYP has changed significantly. As the DOE's complex-wide environmental and waste management programs have become more extensive, the program is subject to increasing oversight by Congress and federal regulatory agencies. It has therefore become increasingly important to correlate site activities to specific requirements within the regulatory network. The FY94 funding amounts have been divided into categories, which include legal compliance; environmental, safety, and health protection; and other areas (desirable management practices, etc.). The enhanced documentation is intended to allow DOE to successfully compete for scarce fiscal resources to support these essential environmental programs.

For convenience, the Rocky Flats FYP has been split into two separate volumes: one for Environmental Restoration and one for Waste Management. The Environmental Restoration FYP has been streamlined by consolidating the funding and planned activities for each of 16 operable unit sites into single ADSs. In FY92, an environmental restoration planning baseline was prepared to support rigorous definition of project cost, scope, and schedule for the FYP ADSs. The baseline is required because the projects encompassed by the Environmental Restoration FYP have been designated as a Major System Acquisition (see Section 1.3).

An FYP for Technology Development (TD) activities is being prepared by DOE-HQ instead of by each site. TD projects are carried out by multi-site teams because of the nature of

research and development work, which requires national-level Technical Activity Data Sheets (TADSs). TD projects and activities at the site level are described in documents called Technical Task Plans (TTPs), which are subunits of larger TADSs.

A crosswalk of old and new ADS numbers is shown in Appendix B. All ADS numbers used in the FY93 SSP reference the new structure of the FY94-FY98 FYP.

For FY92, a document analogous to the FYP was prepared for environmental and waste management programs funded by DOE Defense Programs (DOE-DP). This book has not changed at all; therefore, all activities funded by DOE-DP retain the same numbers from the FY92 SSP.

1.2.2 The Site-Specific Plan

As discussed in the introduction, the SSP serves as a "snapshot" of a single year of the five years covered in the FYP. It also includes much more detailed information about site operations (see Section 1.5, Scope) and addresses environmental and waste management activities funded by DOE-DP, which are not included in the FYP.

1.2.3 Roadmap

The Roadmap planning tool was added on a trial basis in FY91 and then on a full-scale basis in FY92. A Roadmap is a set of documents prepared for each major waste type (low-level waste, transuranic waste, residues, hazardous waste/sanitary waste) and environmental restoration activity. Thus, there are five Roadmap documents for Rocky Flats. Roadmap documents are designed to identify factors that may hinder each program from achieving a desired performance level or goal. The root causes of these problems are then identified, and solutions to address the problems are developed. The end product (the Roadmap document) reflects the current status of the program and outlines the course of action necessary to meet upcoming requirements and overcome foreseeable obstacles. The required activities are then integrated into the appropriate FYP ADS.

The Roadmap process was adopted by DOE-EM to ensure that the scope of the FYP covered all activities necessary to reach the objectives set forth in the FYP. The Roadmap is also a public document that is made available through each of the DOE information repositories listed in Appendix C. Public comment and involvement is being solicited for the Roadmap process, although the mechanisms for this involvement are still being developed.

1.3 FEDERAL BUDGETING PROCESS

A complete discussion of the environmental and waste management planning process should include an overview of the federal budgeting process. Funding requests are submitted by DOE-HQ to the Office of Management and Budget (OMB) two years before funding is actually required. For example, if the project is scheduled to begin in FY94 (the fiscal year runs from October 1 through September 30), the request for funding must be submitted in early FY92.

The FYP is the basis for the DOE-EM proposed environmental and waste management budget submitted to OMB (excluding large construction projects). Large construction projects are submitted to OMB separately under a different process known as the line item funding process. Following OMB approval, the budget is referred to as the "President's Budget." The budget is submitted in January to the congressional subcommittees, who discuss the budget and make recommendations to Congress for appropriations.

The programs encompassed by the FY94-FY98 Environmental Restoration FYP have been designated a Major System Acquisition (MSA). This MSA designation means that the environmental restoration program will be listed separately from other plant projects when the budget is submitted to Congress. This designation makes the environmental restoration program more visible and helps ensure that this program receives the necessary priority. An MSA must meet stringent internal reporting and cost estimating requirements.

After congressional approval, the federal budget is returned to the President, who will either approve or veto it. When a budget is approved, it is processed through OMB to DOE, where program funding levels are established. If approved, funding is generally granted two years after it is requested. A timeline of the budget process is shown in Figure 1.

1.4 BACKGROUND OF ROCKY FLATS PLANT

1.4.1 Location

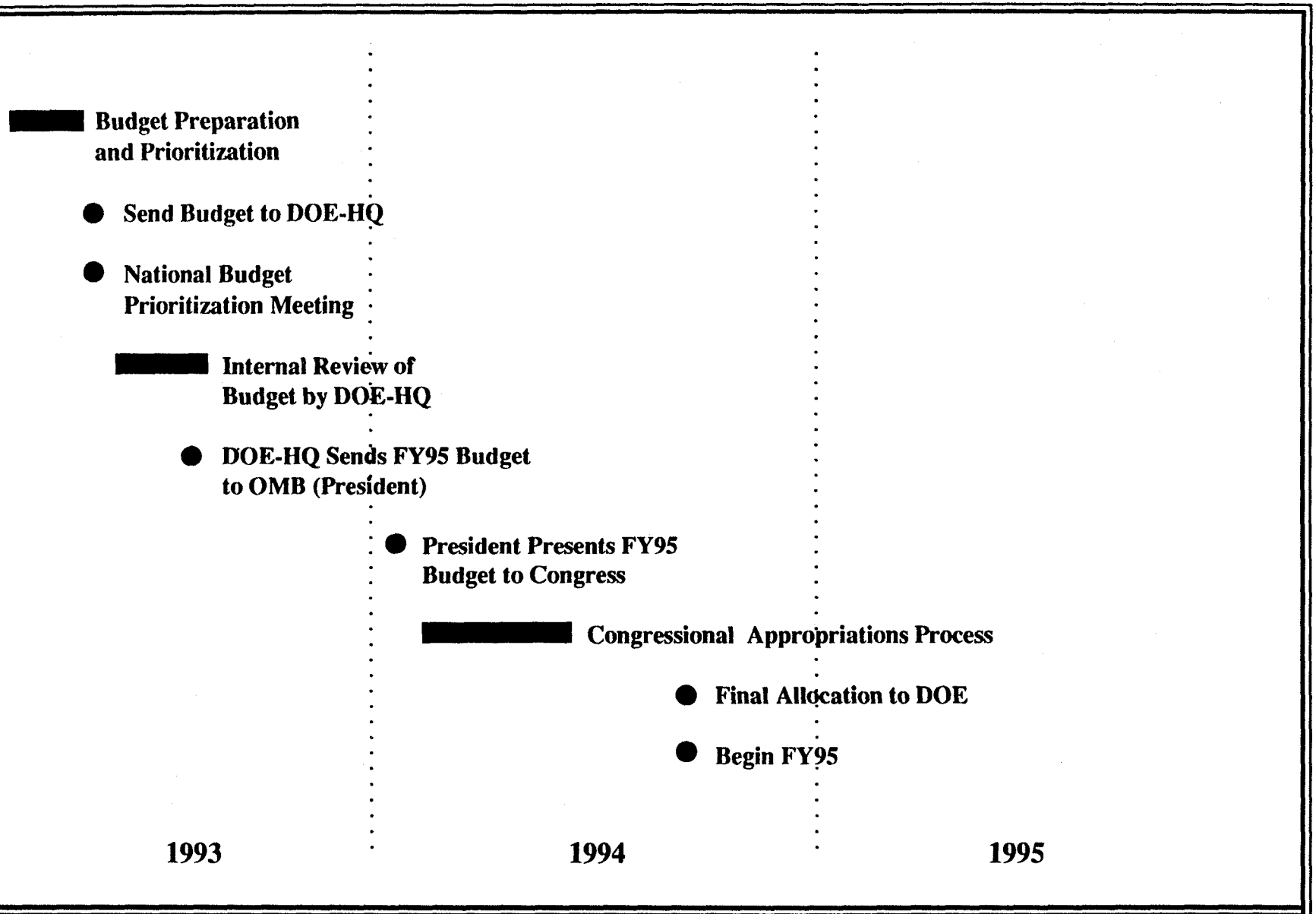
Rocky Flats is located in Jefferson County, Colorado, at the foot of the Rocky Mountains and approximately 16 miles northwest of downtown Denver. The plant is near the suburban communities of Westminster, Broomfield, and Arvada. The location of the site in relation to Denver and surrounding communities is shown in Figure 2. The plant site covers approximately 11 square miles. Of the whole plant site, approximately 0.6 square mile is used for actual plant activities. The Rocky Flats site is shown in Figure 3.

1.4.2 Historical Mission

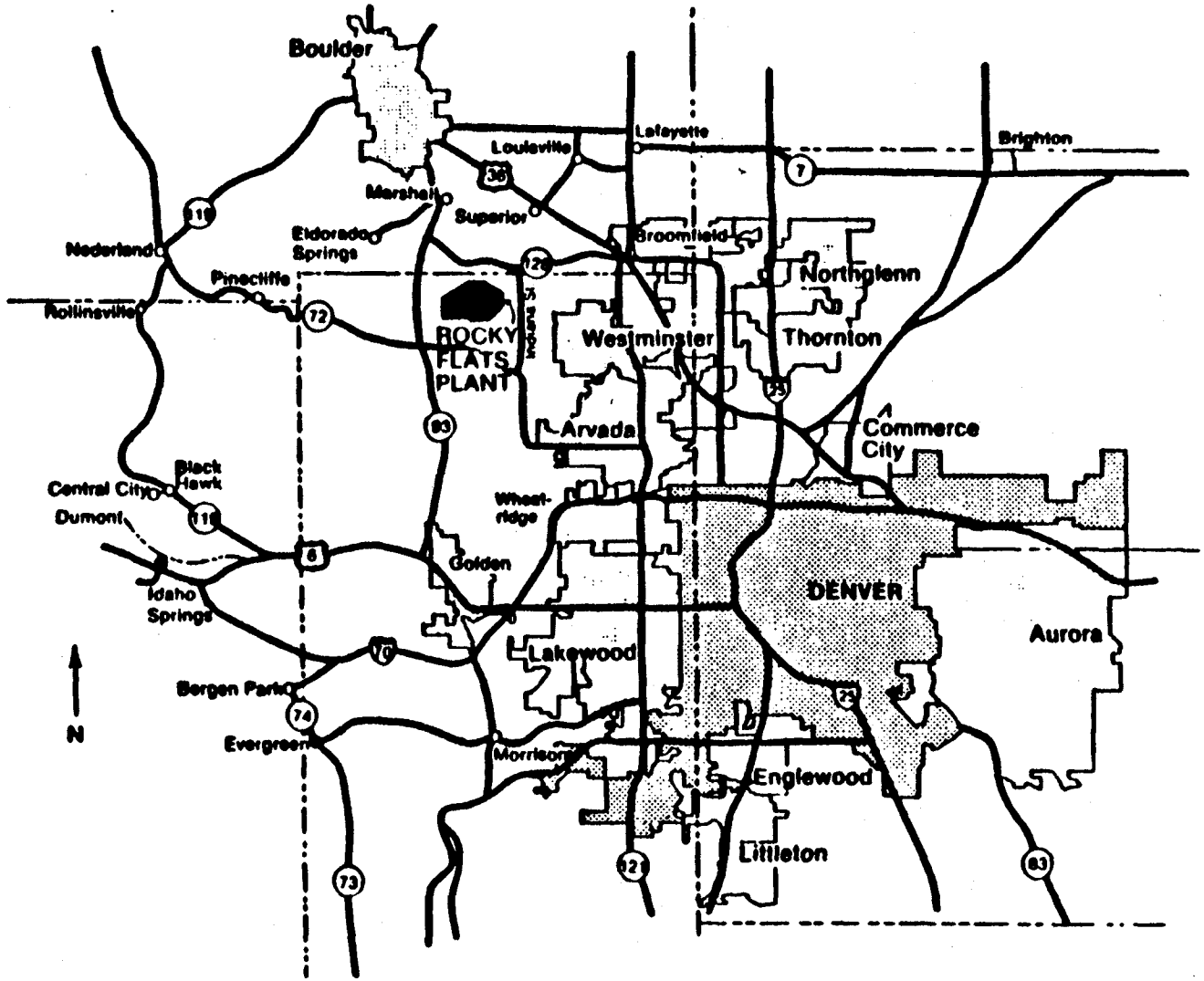
The primary mission of Rocky Flats has been production of components for nuclear weapons. The final products included component parts manufactured from uranium, plutonium, beryllium, stainless steel, and other metals. Production activities included metalworking, fabrication and component assembly, plutonium recovery and purification, and associated quality control functions. Research and development in the fields of chemistry, physics, materials technology, nuclear safety, and mechanical engineering were conducted to further the plant's mission.

The plant was built in 1951 and began operations in 1952. In 1989, many of the plant's production functions were suspended.

In January 1992, President Bush opted to reduce the size of the U.S. nuclear deterrent in response to the changing world situation, and Secretary of Energy Watkins subsequently made the decision to not resume plutonium production at Rocky Flats. With this decision, one era at the plant ended and another began.

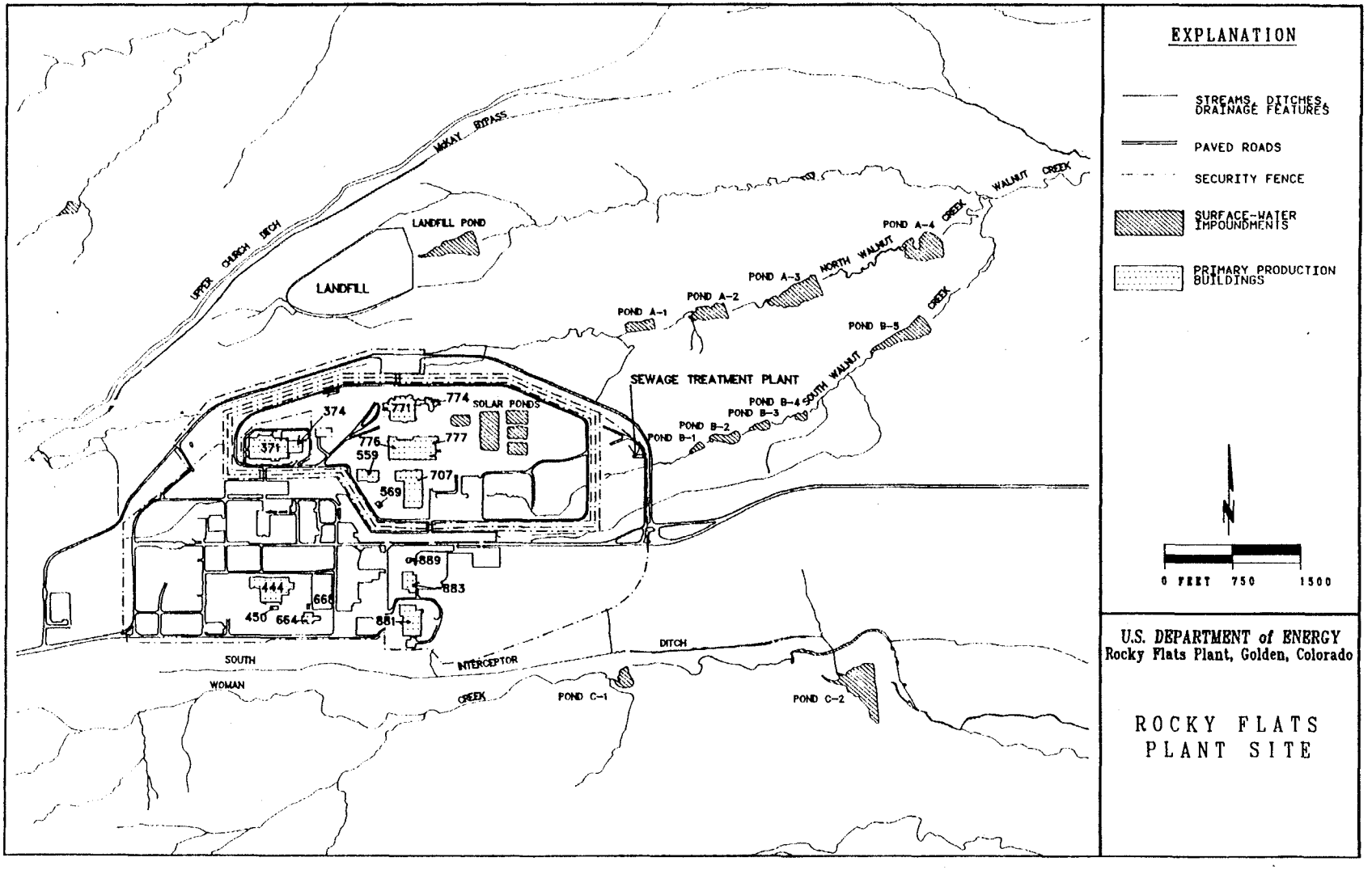


Federal Budget Process
Figure 1



Area Map of Rocky Flats and Surrounding Communities

Figure 2



Rocky Flats Plant Site
Figure 3

1.4.3 Transition

Rocky Flats is preparing for transition from a weapons production site to an environmental and waste management site. The activities under way at Rocky Flats are part of DOE's national-scale, planned modernization of the DOE Weapons Complex, which involves closure, down-sizing, or consolidation of many functions and facilities. As a result, a large number of contaminated facilities are expected to be transferred from DOE-DP to DOE-EM for final disposition. Transition plans will address new issues, including (1) the need for a systematic approach for facility transfer; (2) the need for site-specific transition plans covering the effects of a changing site mission on workers and local communities as well as the actual transfer and disposition of affected facilities; (3) a means to evaluate disposition options for surplus facilities; and (4) early identification and assessment of facilities to be transferred from DOE-DP to DOE-EM.

Transition efforts at Rocky Flats are being carried out by a Transition Team of both EG&G and DOE personnel from various plant disciplines. The team provides experience and expertise focused on preparing and implementing the most technically sound approach to this challenge. The next several years will mark a period of transition, as options are carefully evaluated and long-term courses of action are selected. All environmental and waste management activities at Rocky Flats will continue as currently planned through the transition time frame until a need and course for redirection are fully identified.

The transition plans will integrate the needs of the cleanup activities with the continuing security and nuclear material safety needs, and other DOE-DP activities. As these transition plans are refined, they will be integrated into all environmental and waste management planning documents (FYP, SSP, Roadmap). These activities will also be integrated into national DOE-HQ plans that evaluate the future configuration of the DOE Weapons Complex.

Currently under way for the environmental and waste management portion of the transition activities are two strategic evaluations that support transition efforts. The first is the preparation of a plantwide mass/volume balance, an analytical tool that quantifies the amounts and types of materials that will be generated from a process on the basis of the amounts and types of materials that feed the process. When complete, this balance will identify anticipated masses and volumes of each waste form (including decontamination and dismantlement materials) generated under different planning scenarios. This mass/volume balance will provide information for planning efforts relating to regulatory permitting activities, storage management, facility upgrades, transportation logistics, budgeting, scheduling, and personnel requirements evaluation. As the mass/volume balance becomes more refined, "what if" analyses may be performed on any aspect of transition plans and, in the future, on decontamination, decommissioning, and dismantlement scenarios.

The second evaluation, an Alternative Building Use Analysis, is also under way. This analysis examines buildings for opportunities to utilize existing building space for waste storage, technology development efforts, expanded analytical laboratory space, or use by private industry. Some buildings may be maintained in standby mode to fulfill the national security contingency role mandated by the Secretary of Energy. The analysis will be

integrated into existing plans when evaluating the need for new construction and onsite waste storage and processing capabilities.

At the point that DOE-EM becomes the "landlord" of the site, all activities that are considered landlord functions (air and water monitoring, routine waste operations, and some technology development projects) will be managed and funded by DOE-EM. This change in funding source will not adversely impact the implementation of these activities.

Transition-driven activities are anticipated to require a large section in future SSPs, but for FY93, all activities are still in the developmental stages.

1.5 SCOPE

The SSP describes the work that will be performed at Rocky Flats during FY93. The major sections of this plan provide supporting details for activities in five areas: Corrective Activities, Environmental Restoration, Environmental Monitoring, Waste Management, and Technology Development. The plan covers activities funded by DOE-DP and DOE-EM. The major elements of the SSP are briefly described in the following subsections.

1.5.1 Corrective Activities

Corrective activities are activities required to bring the site into compliance with federal and state regulations and DOE and U.S. Environmental Protection Agency (EPA)/Colorado Department of Health (CDH) agreements pertaining to air, surface water, groundwater, and solids. Because they address only these specific out-of-compliance conditions, corrective activities have been assigned the highest priority of all environmental and waste management activities. As defined by DOE, corrective activities do not include activities needed to meet compliance objectives for handling wastes. The efforts needed to comply with Resource Conservation and Recovery Act (RCRA) regulations pertaining to waste treatment, storage, and disposal are included under waste management activities. As activities are re-prioritized during the funding allocation process, they may be included in the Corrective Activities funding category; however, no FY93 activities are currently funded through this category. This section discusses corrective activities performed in FY92.

1.5.2 Environmental Restoration

Environmental restoration includes cleanup of areas or buildings that have been contaminated in the past and are now either closed down and out of commission or not being actively used in routine operations. Rocky Flats has identified and prioritized 177 contaminated sites, called Individual Hazardous Substance Sites (IHSSs), on and off plant site. These contaminated sites have been grouped according to location and waste type into 16 operable units (OUs). Contamination in these OUs is being assessed, and cleanup activities are being implemented. Sites with potentially higher health and environmental risks are being addressed before sites with potentially lower risk. Maps showing the location of the OUs and a list of the IHSSs are provided in Appendix D.

1.5.3 Environmental Monitoring

Environmental monitoring activities at Rocky Flats provide ongoing environmental monitoring, reporting, and modeling support to the plant. Air-related activities include ongoing monitoring of stack effluents, radioactive and nonradioactive air monitoring, air dispersion modeling, Clean Air Act compliance projects, and meteorological monitoring. Water management activities encompass routine water sampling programs, surface water and groundwater monitoring, and other water management issues. Soil-related activities include routine sampling of soils on plant site and soil sampling to support special projects such as construction activities. These ongoing activities are separate from DOE-EM funded activities and are currently funded by DOE-DP.

1.5.4 Waste Management

Operations at Rocky Flats generate solid and liquid wastes that must be treated and/or stored prior to final disposal. Activities planned by waste management address the minimization, treatment, storage, and disposal of plant waste products. Waste management support activities include program planning, permitting, and monitoring.

1.5.5 Technology Development

Technology development activities include identification and demonstration of new or existing technologies that will allow Rocky Flats to satisfy its environmental and waste management goals. Technology development projects at Rocky Flats focus on minimizing waste, creating waste forms suitable for land disposal, developing better methods for assaying waste, and enhancing monitoring capabilities. Technology development information and resources are shared with other DOE sites and the private sector through technology exchange to enhance the research and development process.

1.6 POLICY

The primary objectives of environmental and waste management programs at Rocky Flats are protection of public health and the environment and compliance with all applicable regulations, DOE orders, and state and federal agreements and permits (see Section 8.0 and Appendix E). The SSP details activities at Rocky Flats that will be undertaken to ensure that these objectives are achieved. DOE is also evaluating various policies for future land use of the site. Current operational and future land-use policies are discussed below.

1.6.1 Current Operational Policy

It is the policy of DOE to conduct site operations in a safe and environmentally sound manner. Secretary of Energy Watkins has made protection of the environment and public health the top priority for all DOE operations. The result has been a firm commitment to formally incorporate environmental protection and safety goals into the daily conduct of operations at the site.

It is the policy at Rocky Flats to conduct operations in compliance with both the letter and spirit of applicable environmental statutes, regulations, and standards. Sound environmental management is a top priority for all programs and facilities, with total regulatory compliance and environmental cleanup as the ultimate goal.

DOE-RFO contractors also share the responsibility for effective environmental and waste management. EG&G shares DOE's commitment to conduct program and project operations in an environmentally sound manner that is in compliance with applicable regulations and protects the environment and public health.

In addition, it is the site policy to undertake appropriate measures to limit generation of contaminants, wastes, and other residual materials requiring disposal or release to the environment through source reduction and recycling. When generation of such wastes cannot be avoided, actions to reduce waste volume and toxicity through treatment will be taken. Rocky Flats will continue efforts to evaluate, select, develop, and integrate technologies that are safer and more effective than existing treatment methods. It is the goal for both DOE and EG&G to increase plantwide awareness at all levels of the need to operate in an environmentally sound manner and to improve environmental stewardship through training, special projects, and incentive programs.

1.6.2 Future Land-Use Policy

During this transition period, DOE intends to consider various future land-use scenarios for the Rocky Flats site. Opportunity for regulatory agency and public input will be incorporated into the decision-making process before a final land-use decision. Future land-use scenarios may include, but are not limited to, the following:

- Designation of the site or portions of the site as an ecological preserve
- Privatization of the site for use by non-governmental industry
- Development of the site as a research or office park for federal agencies other than DOE
- Use of the site by the state government or university system for research or business purposes
- Combinations of the above

These considerations are currently in the very early stages of the planning process, and much work must be done at the site before it is suitable for implementation of any of these options. As transition progresses, the public will be invited and encouraged to participate in the selection of a final land-use option for the Rocky Flats site.

1.7 PRIORITIES

To manage the large number of environmental and waste management activities at Rocky Flats, DOE developed a prioritization system to guide activities and support budget requests included in the FYP. This prioritization system is currently being used for environmental restoration activities at Rocky Flats; a parallel prioritization system is also in place for waste management activities. In addition, DOE is developing a risk-based prioritization system

for ranking facilities in the DOE complex. These prioritization systems are briefly described below.

Environmental Restoration

Priority 1

Priority 1 activities are those necessary to prevent near-term adverse impacts to workers, the public, or the environment. Examples of this type of activity include containment to prevent the spread of contamination and actions to prevent or minimize releases to the environment. Interim Remedial Action plans are considered Priority 1 activities. Also included as Priority 1 activities are ongoing activities that, if terminated, could result in significant program and/or resource impacts. Impacts could include increased risk to the environment or to workers, loss of trained staff, or increased costs. The interim remedial action activities for 881 Hillside Area (OU 1, comprising 12 sites), the 903 Pad, Mound, and East Trenches (OU 2, comprising 20 sites), and the Solar Evaporation Ponds (OU 4, comprising five ponds) have been designated as Priority 1 in the FYP.

Priority 2

Priority 2 activities are those required to meet the terms of agreements (in place or in negotiation) between DOE and tribal governments and federal, state, and local agencies. These agreements represent enforceable, or in the case of Agreements in Principle (AIPs), procedural commitments to complete activities agreed upon by DOE. The OUs were numbered according to the potential risk associated with them; the highest risk OUs have been assigned the lowest number. Numbering of the OUs also reflects public and regulatory input. The OUs that have been assigned Priority 2 in the FYP are as follows:

Site Grouping	OU No.
Offsite Releases	OU 3
Woman Creek	OU 5
Walnut Creek	OU 6
Present Landfill	OU 7
700 Area	OU 8
Original Process Waste Lines	OU 9
Other Outside Closures	OU 10
West Spray Field	OU 11
400/800 Area	OU 12
100 Area	OU 13
Radioactive Sites	OU 14
Inside Building Closures	OU 15
Low-Priority Sites	OU 16

Priority 3

Priority 3 activities are those required for compliance with external environmental regulations but not captured by Priority 1 or Priority 2. Also included under Priority 3 are actions necessary to reach compliance with DOE orders that implement external regulations or that set specific DOE regulatory standards, actions that would reduce risks or costs, and actions that would prevent disruption of the DOE mission. Priority 3 activities in FY93 include support of additional decontamination pads used in restoration-related fieldwork.

Priority 4

Priority 4 activities are activities that are not required by regulation but that would be desirable to implement. Examples of Priority 4 actions include complying with DOE orders that are more stringent than external regulations, implementing improved management practices, reducing personnel exposures below levels required by regulations or standards, and accelerating actions to satisfy an agreement or milestone ahead of schedule. No Priority 4 environmental restoration activities are currently planned at Rocky Flats.

Waste Management

Priority 1

Priority 1 activities include those necessary to prevent near-term adverse impacts to workers, the public, or the environment as well as ongoing activities required to maintain safe conditions or prevent significant impacts to programs and/or resources.

Priority 2

Priority 2 activities include those required to meet the terms of formal agreements (in place or in negotiation) between DOE and tribal governments and federal, state, and local agencies. These agreements represent enforceable, or in the case of AIPs, procedural commitments to complete activities agreed to by DOE. This category does not include permits or permitting activities.

Priority 3

Priority 3 activities include those required for compliance with (1) external environmental regulations not captured by Priorities 1 or 2, (2) activities addressing DOE orders that implement external regulations or that set specific DOE regulatory standards, (3) activities that would reduce risks or costs, and (4) activities that prevent disruption of DOE's mission.

Priority 4

Priority 4 activities include those that are not required by regulation but that would be desirable to implement. Examples include (1) complying with DOE orders that are more stringent than external regulations, (2) implementing improved management practices, (3)

reducing personnel exposures below levels required by regulations or standards, and (4) accelerating actions to satisfy an agreement or milestone ahead of schedule.

Risk-Based Budget Prioritization (DOE Complex)

DOE initiated Risk-Based Budget Prioritization for environmental restoration activities in FY91 as a means to improve the distribution of DOE funding on a national level. Each facility is required to review and prioritize environmental management activities and determine which activities could be performed at maximum, minimum, and intermediate funding levels. Reviews are performed to determine how well the activities reduce risks and environmental contamination at the facility, increase knowledge of the facility, and comply with regulatory requirements.

In FY93, three remediation activities at Rocky Flats contribute to risk reduction. Interim remedial actions at OU 1 - 881 Hillside, OU 2 - 903 Pad, Mound, and East Trenches, and OU 4 - Solar Evaporation Ponds will reduce risks in FY93. The majority of the environmental restoration activities conducted at Rocky Flats in FY93 will be characterization activities. These activities will contribute to knowledge of site geology, hydrogeology, ecology, meteorology, and potential contaminant migration pathways. Characterization reduces the uncertainties regarding the fate and transport of possible contaminants at Rocky Flats. Many activities will contribute to site regulatory compliance.

1.8 MANAGEMENT AND EXTERNAL INTERACTIONS

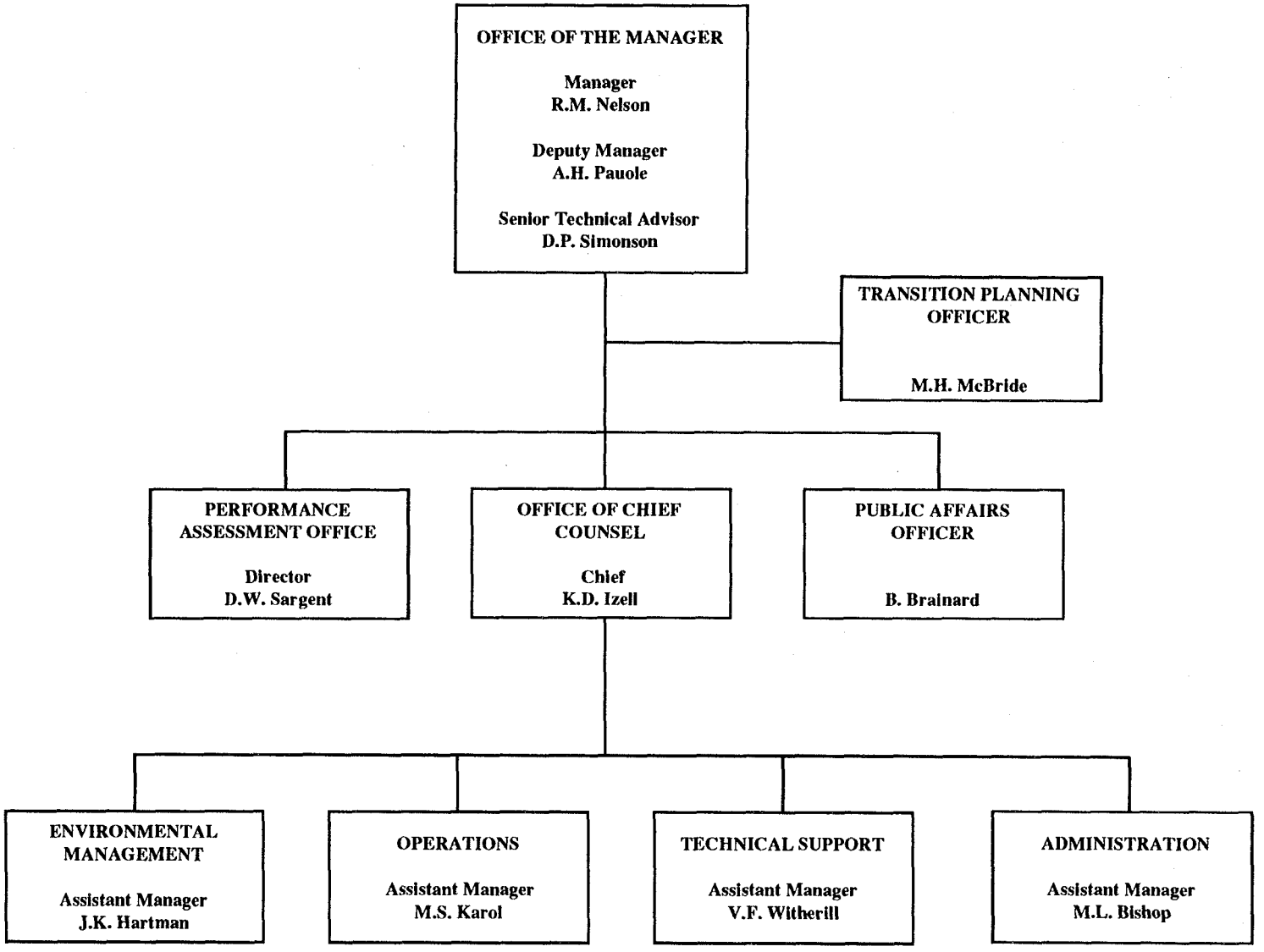
The roles and responsibilities of organizations performing environmental activities at the site are defined below. The roles of external agencies are also discussed with respect to environmental and waste management activities being conducted at the site.

1.8.1 DOE Management Structure at Rocky Flats

DOE-EM and DOE-DP are the DOE-HQ branches that establish policy by issuing orders and directives that guide Rocky Flats activities. These policies are implemented by field offices, such as DOE-RFO, that manage individual DOE installations and programs.

DOE-RFO has been assigned the responsibility and authority to manage and administer the M&O contract at Rocky Flats. This responsibility includes all Rocky Flats activities, including oversight of the plant's environmental restoration and waste management programs and activities.

Responsibility for environmental restoration and waste management is assigned to the DOE-RFO Assistant Manager for Environmental Management, who reports directly to the Manager of DOE-RFO. Within this office are two divisions: Environmental Restoration and Waste Management. In addition, this office has direct responsibility for coordination of environmental and waste management planning documents such as the FYP, SSP, and Roadmap. The organizational chart for DOE-RFO is shown in Figure 4, and the



U.S. Department of Energy
Rocky Flats Office
Organizational Chart, December 17, 1992
Figure 4

organizational chart for the Office of the Assistant Manager for Environmental Management is shown in Figure 5.

The Environmental Restoration Division is responsible for oversight and management of the following:

- All environmental assessment, remediation, and restoration activities
- Soil and groundwater investigation and monitoring systems
- All NEPA compliance activities
- Decontamination and decommissioning activities

The Waste Management Division has three branches: Waste Operations, Waste Programs, and Environmental Monitoring. The responsibilities of each branch are summarized below.

The Waste Operations branch is responsible for managing all site wastes from generation to final disposal. This branch is responsible for oversight and management of the following:

- Waste storage
- Waste treatment
- Waste disposal
- Management of Waste Operations facilities and equipment

The Waste Programs branch is responsible for oversight and management of the following:

- Waste minimization
- Waste characterization
- Waste certification
- Regulatory compliance
- Inventory reporting
- Research and development
- Emergency planning and response

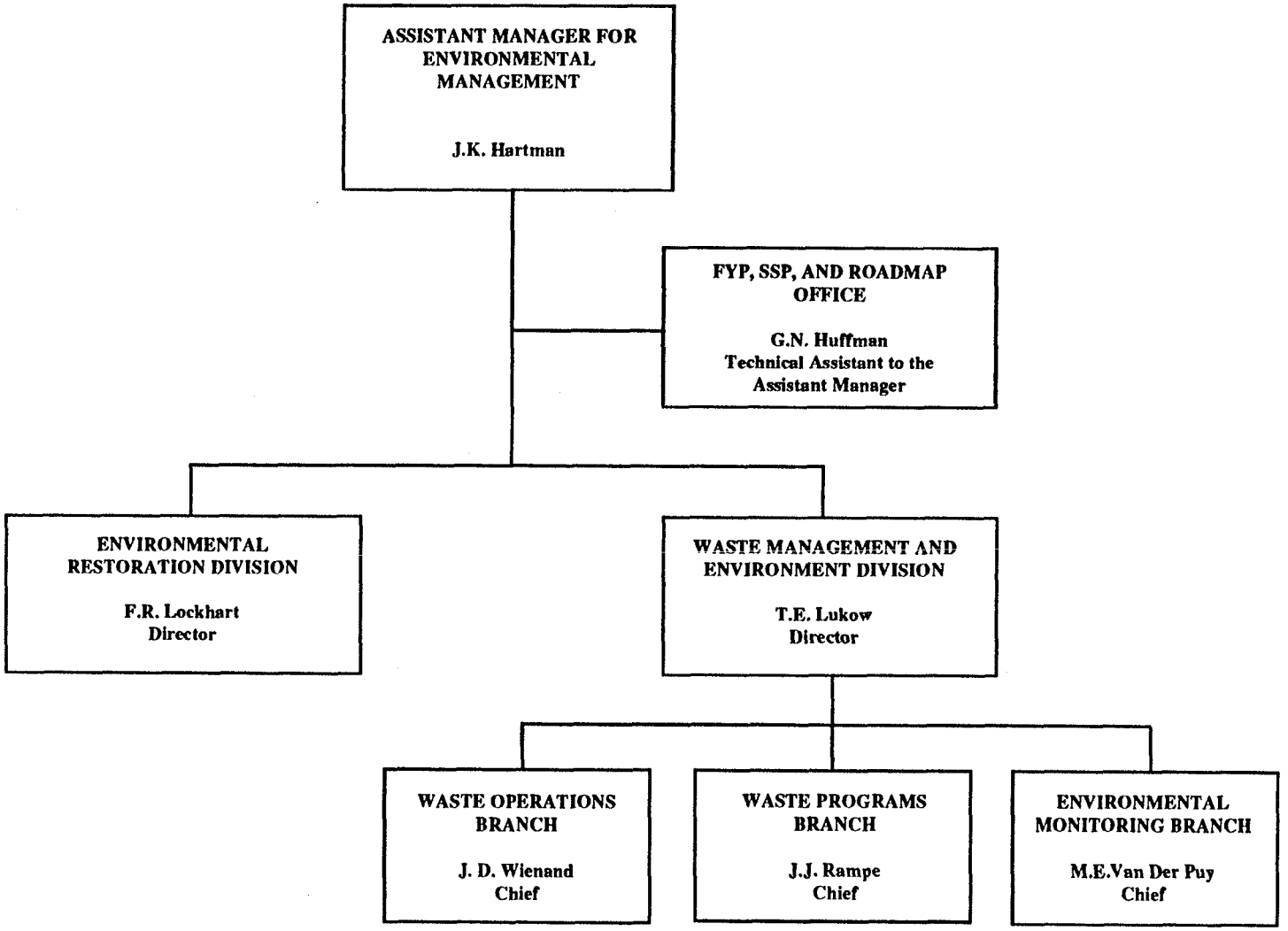
The Environmental Monitoring branch is responsible for oversight and management of the following:

- Ambient environment monitoring of air, groundwater, surface water, soil, and biota for regulated pollutants
- Monitoring permissible releases to the environment
- Hazardous chemical inventory reporting required for notifying the public and protecting public health or the environment in the event of a release

1.8.2 EG&G Organization and Responsibilities

1.8.2.1 Organization

EG&G, as a prime contractor to DOE, provides support to DOE in the operation of Rocky Flats. EG&G is responsible for many site operations, including implementation of environmental and waste management programs. In this capacity, EG&G is committed to



U.S. Department of Energy
Rocky Flats Office
Office of the Assistant Manager for Environmental Management, June 1, 1992
Figure 5

safe, environmentally sound maintenance and operation of site facilities, facility upgrades, operational support, waste management, and monitoring of operations and effluents for environmental compliance. Operations or building managers have day-to-day responsibility for operating their assigned facilities in a safe, environmentally sound manner. The EG&G organizational structure is shown in Figure 6.

Environmental programs at Rocky Flats are carried out by the Environmental and Waste Management (E&WM) and Environmental Restoration Management (ERM) organizations. E&WM consists of five directorates: Waste Operations, Waste Programs, Technology Development, Environmental Protection Management, and Analytical Labs. ERM consists of seven directorates: ERM Remediation Project Management, ERM Environmental Science and Engineering, ERM Solar Pond Projects, ERM Facility Operations, Environmental Restoration Records and Reporting, ERM Sample Management, and Environmental Quality Support. The ERM and E&WM Associate General Managers report directly to the General Manager. The organizational responsibilities for each of the groups under both associate general managers are outlined below. The E&WM and ERM organizational charts are shown in Figures 7 and 8, respectively.

1.8.2.2 E&WM Responsibilities

Waste Operations

The Waste Operations organization is responsible for treating, storing, and preparing for shipment all types of waste generated at Rocky Flats. This organization is also charged with day-to-day operation of treatment and storage facilities in compliance with applicable environmental regulations and safety guidelines.

Waste Programs

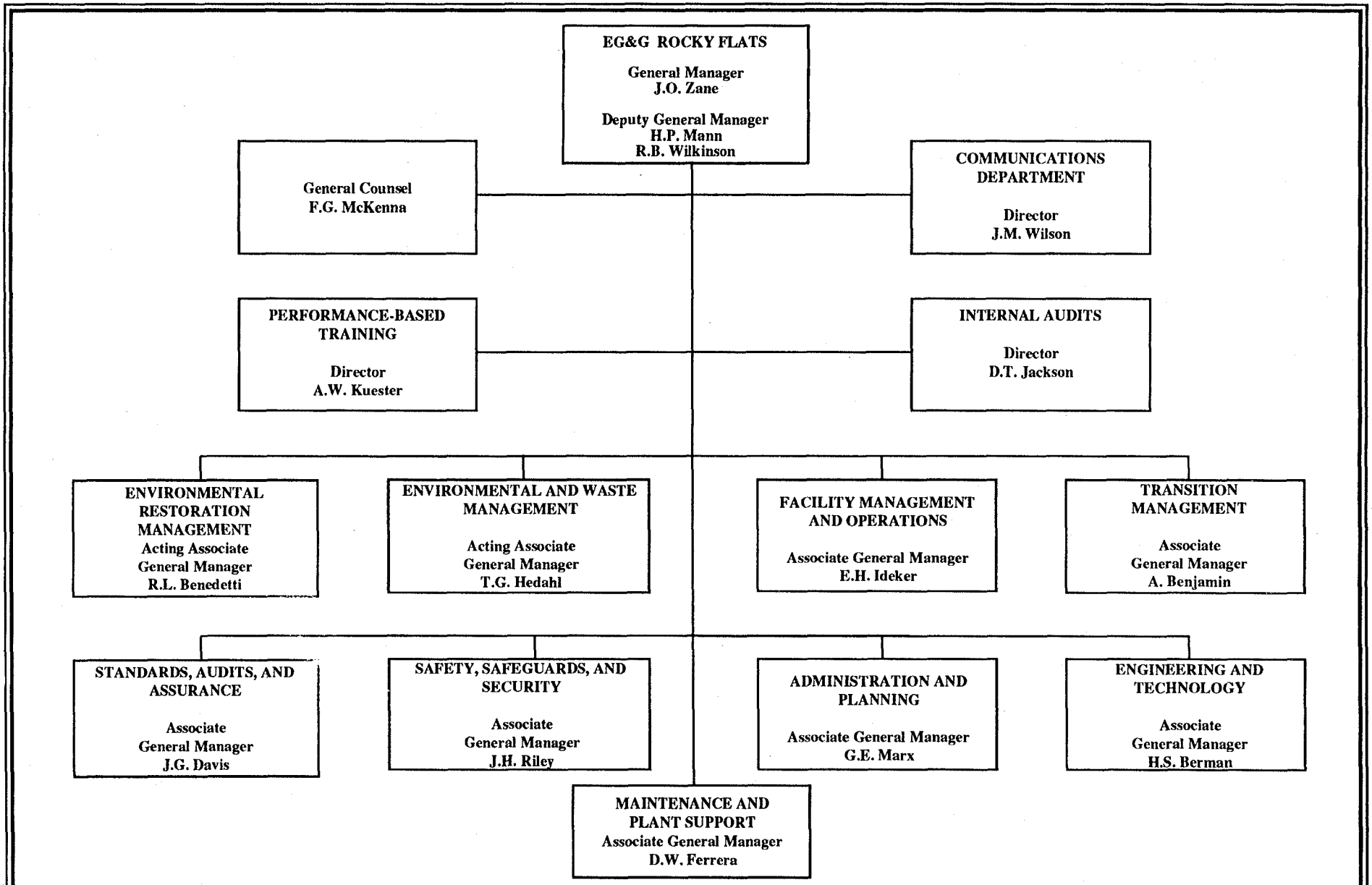
The Waste Programs organization is responsible for permitting activities, technical support, procedure and training development, waste minimization oversight, and compliance agreement documentation.

Technology Development

The Technology Development organization is responsible for evaluation, selection, development, and transfer of integrated technologies necessary for the site to satisfy environmental and waste management requirements.

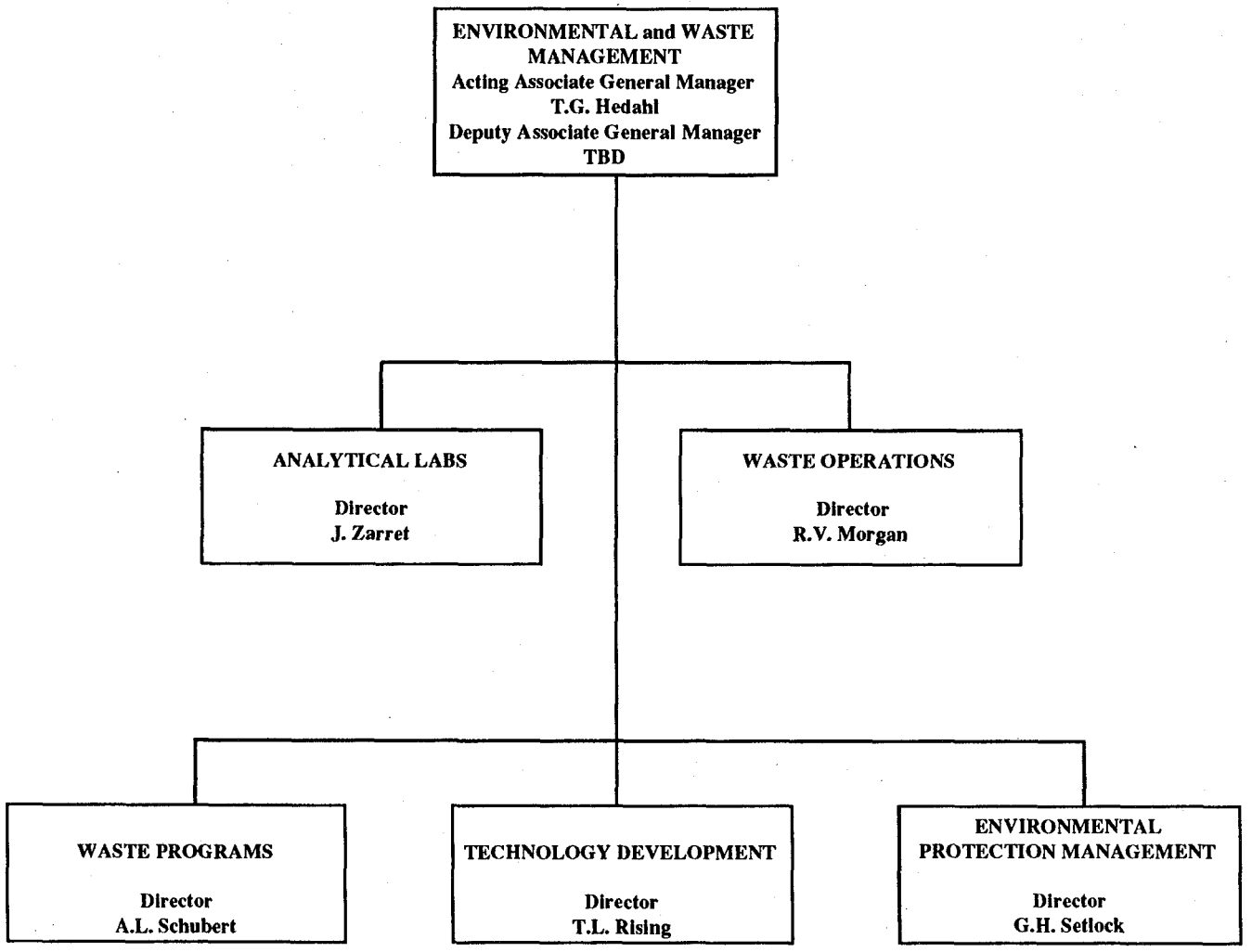
Environmental Protection Management

The Environmental Protection Management organization manages soil, water, and air sampling and assessment activities. NEPA support to affected plant programs is also administered through this office.

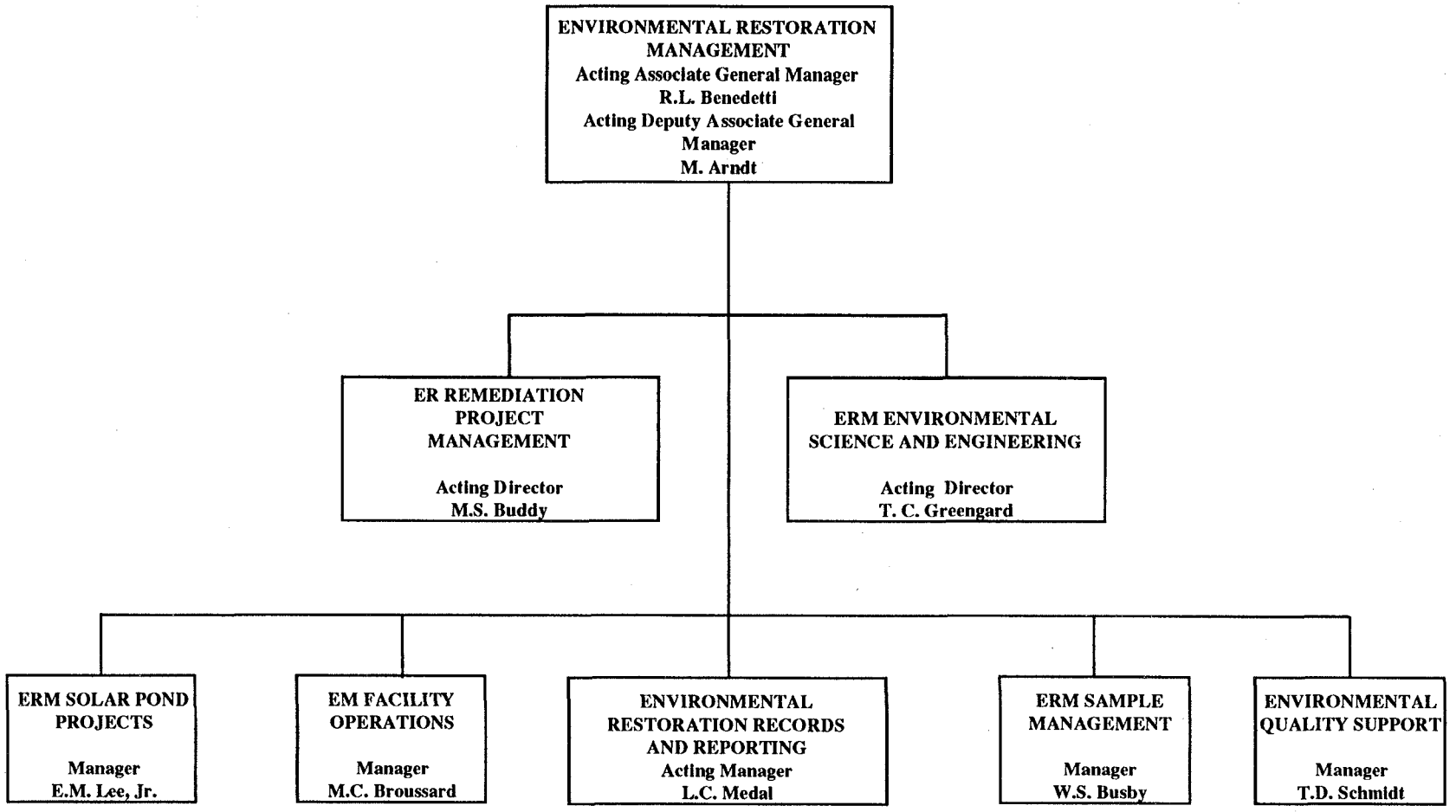


EG&G Rocky Flats, Inc.
Organizational Chart, December 14, 1992

Figure 6



EG&G Rocky Flats, Inc.
Environmental & Waste Management
Organizational Chart, December 14, 1992
Figure 7



EG&G Rocky Flats, Inc.
Environmental Restoration Management
Organizational Chart, January 22, 1993
Figure 8

Analytical Labs

The analytical labs provide onsite analytical characterization capability for the plant.

1.8.2.3 ERM Responsibilities

ERM Remediation Project Management

The ERM Remediation Project Management division is responsible for the management of all environmental restoration projects.

ERM Environmental Science and Engineering

The ERM Environmental Science and Engineering division is responsible for integrating all technical and engineering services needed to support site characterization and remediation.

ERM Solar Pond Projects

The ERM Solar Pond Projects division provides oversight and management of the solar pond cleanout project, including pond water management, sludge removal and solidification, site assessment, and backlog saltcrete and poncrete reprocessing (see Section 3.4.4).

ERM Facility Operations

The ERM Facility Operations organization is responsible for the safe and proper operation, coordination, and maintenance of environmental restoration facilities. The organization is also responsible for identifying and properly managing investigation-derived material from environmental restoration activities and for preparing environmental restoration generated waste for transfer to Waste Operations.

Environmental Restoration Records and Reporting

The Environmental Restoration Records and Reporting organization is responsible for information management activities that encompass and support the technical and regulatory information associated with environmental restoration activities.

ERM Sample Management

The ERM Sample Management office is responsible for tracking environmental restoration samples from collection to archive and for maintaining and updating the Rocky Flats Environmental Database System (RFEDS).

Environmental Quality Support

The Environmental Quality Support organization is responsible for developing and implementing a quality assurance program that meets the DOE and EPA/CDH quality assurance requirements for environmental restoration activities (see Section 7.3.4.1).

1.8.2.4 Additional Support

Other EG&G Organizations

The functional organizations described above also receive support from many other EG&G organizations. These major support organizations include Transition Planning, Maintenance, Quality Assurance (quality inspections), Health and Safety (radiological and personnel protection), Performance-Based Training, Safeguards and Security, Engineering (plant modification design, project management, and facility configuration management), Administration and Planning (communications), and Facilities Project Management.

Contract Support

Contractors specializing in environmental restoration, radioactive and hazardous waste management, engineering, and laboratory services are also used at Rocky Flats. A significant amount of the work described in this plan is performed by subcontractors, who are required to comply with applicable plant policies and government regulations. Examples of subcontractor support activities include fieldwork, remedial investigations, support of NEPA documentation activities, program planning, operational readiness reviews, safety analyses, and RCRA permitting.

Personnel Training

All personnel who perform or supervise the handling of fissile materials are required to undergo training in fissile materials handling and characteristics. All nuclear workers receive formal training in nuclear safety, radiation safety, industrial safety, and hazardous materials handling and shipping. Two types of classroom training in radioactive waste management are provided, one specific to employees working with transuranic waste and one specific to employees working with low-level waste. On-the-job training provides specific waste management training in the individual's work area. In addition, all operating procedures are written to comply with the regulations and guidelines established by the various government agencies with regard to the handling of radioactive waste.

Persons directly and indirectly responsible for handling RCRA-regulated wastes (mixed or hazardous) are required to complete a training course that details safe management of hazardous wastes; requirements for recordkeeping associated with the accumulation, treatment, storage, inspection, and shipment of these wastes; and response to emergency situations. On-the-job training specific to an employee's work area is provided by first-line supervisors.

1.8.3 Interaction with Offsite Agencies and Organizations

Several external federal, state, and local agencies are responsible for enforcing environmental regulations at Rocky Flats. Principal among these agencies are EPA and CDH. These agencies issue permits, review compliance reports, participate in joint

monitoring programs, inspect facilities and operations, and monitor compliance with applicable regulations and permits.

EPA develops, promulgates, and enforces environmental protection standards and regulations as directed by federal statutes. In cases where regulatory authority can be delegated, EPA delegates authority to CDH for state programs that meet or exceed EPA requirements. Where regulatory authority is not delegated (e.g., Comprehensive Environmental Response, Compensation and Liability Act [CERCLA]), EPA Region VIII (which geographically includes the State of Colorado) is responsible for reviewing and evaluating compliance with EPA regulations as they apply to Rocky Flats. This includes interpreting regulations, consulting with DOE to aid implementation of regulations, inspecting facilities and operations at the site, and assisting appropriate state agencies in regulating operations at the site.

Other external organizations are also involved in environmental activities at Rocky Flats. The organizations include the following:

- U.S. Department of Transportation (DOT), which regulates interstate transport of commodities and hazardous materials, including hazardous waste
- Governor's Rocky Flats Scientific Panel on Monitoring Systems, which evaluates and recommends monitoring systems
- Rocky Flats Environmental Monitoring Council, a group that helps inform the public regarding plant activities; members are appointed jointly by the Governor of Colorado and the congressional member from Colorado's 2nd Congressional District
- Natural resources trustees under CERCLA, which are the U.S. Fish and Wildlife Service, the Colorado Attorney General, the Colorado Department of Natural Resources, and CDH

These external organizations (specifically CDH and EPA) and DOE have entered into several important agreements that outline the steps to be taken to reach compliance with certain applicable environmental regulations. These agreements are discussed in detail in Section 8.0.

1.8.4 Public Involvement

RCRA, CERCLA, and the Colorado Hazardous Waste Act (CHWA) include provisions for public involvement in waste management and environmental restoration, respectively. The Interagency Agreement (IAG) between DOE and EPA/CDH integrates these provisions and supplements them with additional community relations requirements. DOE is committed to involving the state, local governments, and the public in planning and implementation of environmental and waste management initiatives beyond statutory requirements. Public review of and comment on the SSP are part of this effort.

The Community Relations Plan developed by Rocky Flats addresses the concerns and interests of the surrounding community, as identified through a series of interviews with almost 100 representatives of the community.

The following public information and involvement activities have been incorporated into the Community Relations Plan:

- Rocky Flats responds to citizen queries and requests for information regarding the site on a daily basis. By calling a toll-free number (800-446-7640), the public can access information on upcoming Rocky Flats meetings and current activities or leave messages with questions and comments.
- The DOE Rocky Flats Public Reading Room, which contains historical and current documents and articles pertaining to Rocky Flats, is maintained at the Front Range Community College Library in Westminster, Colorado. The reading room serves as a repository for plans, studies, and reports generated under CERCLA and RCRA remediation processes; planning documents such as the SSP and FYP; and various other reports and documents as requested by the public. Members of the public are encouraged to use the reading room for research and document review. Public documents released by Rocky Flats are also available through the Rocky Flats Environmental Monitoring Council in Golden, Colorado; at the CDH and EPA offices in Denver, Colorado; and at the Jefferson County Public Library, Standley Lake Branch, in Arvada, Colorado. Additional information regarding the public document repositories, including their addresses and hours, is included in Appendix C.
- Public meetings are conducted to inform the community of site activities. In addition, site personnel meet frequently with federal, state, and local government officials, businesses, schools, and other organizations upon request to discuss issues of interest to the community.
- Written and oral public comment on site documents is solicited regularly as a means of incorporating citizen input into site plans and actions.
- Rocky Flats maintains a list of individuals and organizations who receive meeting announcements, notices of document availability, fact sheets, and other information. The mailing list currently includes more than 1,900 entries.
- A public tour program allows members of the public to visit the site and to talk with experts regarding environmental restoration, waste management, and other activities.
- A speakers' bureau provides the community with experts to address a variety of topics pertaining to Rocky Flats.

- Several times per year, Rocky Flats publishes an update that describes environmental restoration progress and plans. This update is provided to each individual and organization on the mailing list. Interested parties can be added to the mailing list by contacting the Public Affairs Officer at DOE-RFO.
- News releases are issued periodically to inform the public of activities and events at the site.
- Employees receive information regarding the site through a series of internal publications, public announcements, and meetings with managers.

1.9 FUNDING SUMMARY

Environmental and waste management activities at Rocky Flats are funded by both DOE-DP and DOE-EM. DOE-EM provides funding for specific activities within the corrective activities, environmental restoration, waste management, and technology development programs. Other activities, known as base activities, within these programs (e.g., ambient air monitoring and permitting activities) are considered "landlord" functions for Rocky Flats and are funded by DOE-DP.

Summary funding for these activities is presented in Table 1, which reflects anticipated funding levels for FY93. These funding levels may change prior to or through FY93 as program requirements or budget allocations are revised. Funding requirements for FY94-FY98 have been estimated and are presented in the FY94-98 FYP. FY93 funding for DOE-EM projects is presented in Appendix F.

Table 1
FY93 Anticipated Funding
(in thousands of dollars)

CATEGORY	FUNDING SOURCE	FUNDING LEVEL
Corrective Activities	DOE-EM	$ 0
Environmental Restoration	DOE-EM	161,120
Base Environmental	DOE-DP	74,200
Waste Management	DOE-EM	117,524
Base Waste Management	DOE-DP	41,300
Technology Development	DOE-EM	13,094
Base Technology Development	DOE-DP	1,417
TOTAL		$408,655

1.10 PLAN ORGANIZATION

The remainder of this SSP is divided into nine major sections. Sections 2.0 through 6.0 present Rocky Flats activities in the categories of Corrective Activities, Environmental Programs, DOE-DP Environmental Programs, Waste Management, and Technology Development. Section 7.0 provides a discussion of quality assurance. Section 8.0 lists agreements and orders applicable to Rocky Flats. In Section 9.0, an overview of the NEPA process is presented. Supplemental information, including a list of acronyms and abbreviations (Appendix G) and a glossary (Appendix H), is provided as appendices.

2.0 CORRECTIVE ACTIVITIES

2.1 PROGRAM SUMMARY

Corrective activities are those activities necessary to bring active and standby facilities into compliance with federal, state, and local regulations with respect to air, surface water, and groundwater. Because they address specific out-of-compliance conditions regarding near-term threats to air or water, corrective activities have been assigned the highest priority of all environmental and waste management activities at Rocky Flats. All of the open corrective activities at Rocky Flats for FY92 involved air emissions. The major regulatory drivers are the Clean Air Act, Tiger Team Audit findings, DOE orders, and the Colorado Air Quality Control Act. Corrective activities follow a cycle consisting of identification, evaluation, funding, implementation, and closeout. When an activity becomes repetitive or routine, it is no longer considered a corrective activity and the program is shifted to the appropriate operational organization. Corrective activities are funded for the initial years through DOE-EM but are shifted to DOE-DP funding when the task becomes a routine operations function or when compliance is achieved.

Compliance deficiencies are identified through various review processes, including DOE-HQ Tiger Team Audits, environmental surveys, DOE field office audits, contractor audits, and audits conducted by the state and regulatory agencies. Responses to deficiencies are developed in consultation with regulatory agencies and, in some cases, may be included in negotiated agreements. If noncompliance is identified, corrective action plans are developed for achieving compliance. These plans include actions related to permit development, technology assessment and direction, facility changes, proposed budgets, and implementation schedules. Corrective action plans are reviewed by the regulators, modified as appropriate by DOE, and approved as part of the annual planning process. Funding requirements are included in the FYP and are updated annually.

Because corrective activities must be completed in a timely and effective manner to protect public health and safety and the environment, these activities will generally be accomplished through application of existing technologies rather than new technologies that would require lead time for development.

All of the Rocky Flats corrective activities reported in previous SSPs have been moved into the appropriate DOE-DP funded group. When the site is transitioned to a DOE-EM site, the funding for these programs will be provided through DOE-EM.

The status of corrective activities performed in FY92 is presented below.

2.2 AIR EMISSIONS

The activities described in this section are required to bring active and standby facilities into compliance with existing regulatory requirements, the Clean Air Act, DOE orders, and pertinent agreements (such as the AIP).

2.2.1 Upgrade Radioactive Stack Sampling

National Emissions Standards for Hazardous Air Pollutants (NESHAPs) establish detailed requirements for the monitoring of airborne radionuclides. These requirements specify the locations of air sampling sites and how monitoring should be performed. To comply with NESHAPs, monitoring must be performed continuously and isokinetically. Prior to this rule, sampling sites and methods at Rocky Flats were guided by DOE Order 5400.1 and DOE's Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. A Tiger Team Audit performed in 1989 noted that the radioactive stack sampling locations then in use were not sited in accordance with NESHAPs and did not sample isokinetically.

In FY92, remediation activities to correct these deficiencies were largely funded under ADS #83 and routine NESHAPs compliance activity was funded by DOE-DP ADS #5014 (see Section 4.1.1).

The following activities were accomplished in FY92:

- Completed stack upgrade studies
- Determined new velocity profiling locations in accordance with NESHAPs requirements

In FY93, the implementation of these activities was to be funded by DOE-DP ADS #5083. However, the implementation strategy for these activities was modified when EPA issued the Administrative Compliance Order (ACO) of March 3, 1992, that accelerated the implementation schedule for these projects. This ACO is commonly known as the Radionuclide NESHAPS ACO. The activities to fulfill the requirements and schedules of this ACO are funded by DOE-DP (see Section 4.1.1).

2.2.2 Survey and Identify Existing NESHAPs Emissions (ADS #109)

This project had been designed to fulfill NESHAPs and Colorado Air Quality Control Act reporting and monitoring requirements for effluent beryllium emissions. For compliance with NESHAPs requirements, a one-time stack sampling study for beryllium was required within 30 days of resumption of 80 percent of beryllium processing.

Although the procedure for beryllium sampling has been modified to comply with NESHAPs and Colorado air pollution control regulations and the proper sampling equipment has been procured, this activity has not occurred because full beryllium operations did not restart in FY92. As a result of the change in plant mission, beryllium operations may never reach a level that would allow this sampling to take place. If this sampling is required in FY93, it will be funded under DOE-DP ADS #5014.

3.0 ENVIRONMENTAL RESTORATION PROGRAMS

This section presents a discussion of the environmental restoration processes for contaminated sites and the specific application of these processes at Rocky Flats. The following are provided: (1) an overview of DOE's environmental restoration program at Rocky Flats, (2) a description of the regulatory framework within which this program is being implemented, (3) a discussion of the implementation of the RCRA and CERCLA processes at Rocky Flats, and (4) descriptions of remedial actions, including accomplishments for FY92 and activities planned for FY93.

3.1 ENVIRONMENTAL RESTORATION OVERVIEW

The Rocky Flats environmental restoration program is part of the national DOE Environmental Restoration program, which was established to identify and clean up inactive waste sites at DOE facilities. The primary objective of DOE's Environmental Restoration program is to clean up these sites in compliance with applicable federal and state environmental laws and regulations while maintaining the health and safety of the public and workers as well as protection of the environment. Specifically, the program includes site identification and characterization, remedial design and cleanup action, and post-closure activities such as monitoring and field inspections at inactive radioactive, hazardous, and mixed-waste sites.

To fulfill Environmental Restoration program objectives, Rocky Flats must (1) identify all remedial action alternatives necessary and feasible to clean up contamination resulting from past Rocky Flats activities and (2) provide an identifiable, accountable, and coherent program through which all environmental activities can be coordinated and reported. DOE's overall strategy for achieving its goal of cleaning up Rocky Flats by 2019 includes the following:

- Identification of inactive contaminated facilities and sites
- Assessment of these facilities and sites to determine the nature and extent of contamination
- Containment of existing contamination to minimize its further migration
- Preparation of detailed work plans (approved by regulatory agencies) for investigation of these facilities and sites
- Assurance that cleanup is carried out in strict accordance with approved remedial action plans
- Implementation of long-term monitoring programs to ensure continuing compliance

3.2 REGULATORY FRAMEWORK

Remediation of DOE sites must be performed in compliance with applicable federal and state environmental laws and regulations. Before the enactment of current federal environmental legislation, DOE managed waste storage and disposal under requirements established by authority of the Atomic Energy Act. In response to subsequent regulations, DOE has established programs to achieve compliance with environmental laws as they

pertain to (1) generation, treatment, storage, disposal, and transportation of wastes produced in operating facilities and (2) contaminant characterization and cleanup at inactive sites.

The principal regulatory requirements for remedial actions are those derived from RCRA, and CERCLA. These federal statutes require that hazardous waste sites and hazardous substance spills/releases be investigated, characterized, and cleaned up. CERCLA and RCRA contain parallel guidance for the sequence of cleanup activities. The primary component of the CERCLA process is the Remedial Investigation/Feasibility Study (RI/FS); the primary component of the RCRA process is the RCRA Facility Investigation/Corrective Measures Study (RFI/CMS). Rocky Flats is currently performing both CERCLA and RCRA activities; therefore, both RI/FS and RFI/CMS activities are being conducted. A general description of the RI/FS and RFI/CMS processes at Rocky Flats is presented below. More detailed information regarding CERCLA and RCRA may also be found in the following EPA guidance documents:

- Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA, Interim Final, October 1988
- RCRA Facility Investigation Guidance, Interim Final, May 1989
- Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision, March 1988
- Compendium of Superfund Field Operation Methods, September 1987

3.2.1 CERCLA Remedial Investigation/Feasibility Study Process

CERCLA (also known as "Superfund"), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) provides for investigation and cleanup of sites on the National Priorities List (NPL), which is EPA's list of the highest priority uncontrolled or abandoned hazardous waste sites. Sites are added to the NPL in several ways, including the following: (1) the site is nominated by the state for reasons such as identification of a threat to human health; (2) contaminant spills or releases are reported to the National Response Center, resulting in an EPA investigation of the site; or (3) the site has a Hazard Ranking of greater than 28.5, based on scoring criteria from reports and investigations to determine the level of threat to human health. As of June 1992, the NPL included over 1,200 sites. Rocky Flats is a single site on the NPL and was first listed in 1989.

The RI/FS process under CERCLA has been established to characterize the nature and extent of potential risks at abandoned hazardous substance sites and to evaluate treatment alternatives for those sites. Implementation of an RI/FS is a dynamic and flexible process that can be tailored to address the specific problems of each site. The RI/FS process is designed to accommodate new information, new direction, and new technologies as they become available. An RI/FS may be conducted by EPA, the state, the past or present owner/operator, or by a combination of regulatory agencies and owners/operators.

EPA guidelines for the RI/FS process, as set forth in Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (available at the EPA Region VIII Library in Denver, Colorado) are discussed below. The RI/FS process specific to Rocky Flats is discussed in Section 3.3.4.

An RI consists of characterization of the nature and extent of contamination and evaluation of any risks that the site may pose to human health or the environment. Information collected and analyzed during the RI is utilized in the FS, which consists of evaluation of remedial treatment alternatives on the basis of their technical merit and cost-effectiveness. The FS leads to a recommendation of treatment alternatives or the "no action" alternative if risks are determined to be below levels of concern to public health and safety.

The RI/FS process incorporates the following components:

- Scoping
- Remedial Investigation
- Feasibility Study
- Remedy Selection and Remedial Action

The generic RI/FS and RFI/CMS processes are illustrated in Figure 9. In general, EPA or the designated agency (hereafter, collectively called the "regulatory agency") takes the lead on the scoping process, the owner/operator of the site performs the RI and FS, and the regulatory agency selects the remedy. Each RI/FS process component is briefly described below.

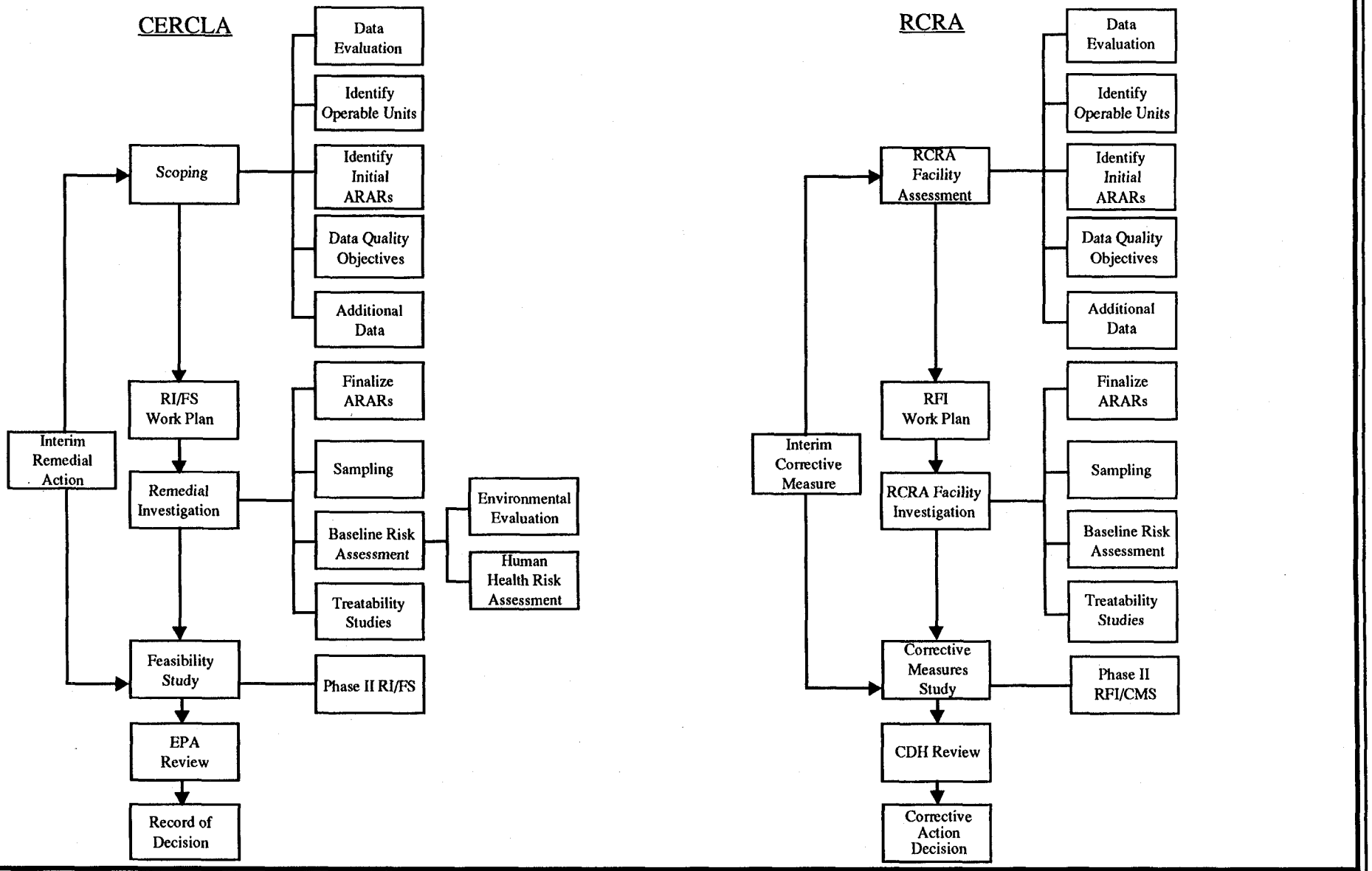
Scoping the Remedial Investigation/Feasibility Study

The scoping process focuses the RI/FS process by outlining the goals and objectives of the study, defining the data quality objectives to be met during the investigations, and preliminarily identifying applicable regulations. Scoping also helps to streamline the process by identifying, early in the process, the direction that the program will take, thus allowing activities to begin as soon as possible.

The goals and objectives of the RI/FS are defined by the regulatory agency and are identified in the initial assessment of site conditions. The scoping of an RI/FS has the flexibility to allow additional data and new decisions to be incorporated as the process proceeds. The scoping activities that further direct and guide the RI/FS are summarized as follows:

(1) Evaluation of Existing Data and Development of Conceptual Site Model

All available information regarding past and current waste handling and disposal practices, site history, biology, geology, hydrogeology, and demographics, is collected and analyzed to characterize current site conditions. These data are used in developing the conceptual site model, which describes contaminants, their sources, and potential migration pathways. This model assists in identification of sampling locations and possible remedial alternatives. In addition, the site conceptual model may identify the need for immediate remedial or removal actions (Interim Remedial Action or Interim Corrective Measure).



Flow Diagrams for RCRA and CERCLA Assessment Processes

Figure 9

(2) Identification of Initial Project and Operable Units, Likely Response Scenarios, and Remedial Action Objectives

After the conceptual model has been developed, sites can be divided into workable portions called operable units (OUs). In 40 CFR 300.6, an OU is defined as "a discrete part of the entire response action that decreases a release, threat of release, or pathway of exposure." OUs may be defined as geographic areas, areas with similar contamination, or contaminated media (e.g., soil or surface water).

(3) Initial Identification of Applicable Federal and State Regulations

Applicable or Relevant and Appropriate Requirements (ARARs) are identified at several stages during the RI/FS. The scoping process includes initial identification of federal and state regulations that may apply to the site and its cleanup. ARARs are further defined later in the RI/FS process.

(4) Identification of Initial Data Quality Objectives

Data quality objectives specify the types and quality levels of data needed to support the RI/FS process. Given the dynamic nature of the RI/FS process, data quality objectives may change as a result of new site information.

(5) Identification of Additional Data and Treatability Study Requirements

The need for additional data and treatability studies may be determined during the scoping process. The types and quantities of data necessary for the RI/FS are identified so that data collection and data management plans can be developed. Based on the initial data evaluation, the site may have contamination that cannot be cleaned up by conventional technologies and may require treatability studies. Identifying this need as early in the process as possible allows for the timely start of the treatability study program. Treatability testing, using conventional or alternative treatment processes, is intended to reduce cost and performance uncertainties to acceptable levels to allow an effective remedy to be selected.

(6) Preparation of Project Planning Documents

After the basic direction of the RI/FS has been decided, the actual program planning can begin. The first planning document required for the RI/FS is the RI/FS work plan, which presents the site background and physical setting, initial data evaluation, work plan rationale, and the RI/FS tasks to be completed. Additional planning documents may include a conceptual design report, design criteria, project management plans, data management plan, quality assurance/quality control plan, health and safety plan, and field sampling plan. Other documents may be required, depending on the type of site and the type of work being considered.

Remedial Investigation

The RI portion of the program begins with a field investigation conducted for the purpose of collecting data to fill gaps in historical data. This data collection activity is designed to answer questions regarding the types of contaminants, the amounts of contaminants, the area contaminated, contaminant sources, the spread of contamination (how fast, what direction, how far), and the risk to human health and the environment.

Samples of appropriate media (e.g., groundwater, surface water, or soil) are obtained for laboratory analysis, and the analytical data are validated. When data validation is complete, the data undergo analyses to yield an understanding of the nature and extent of the contamination.

Other tasks that may be performed concurrently with data analysis include the Baseline Risk Assessment and the identification of chemical- and location-specific ARARs. The Baseline Risk Assessment conducted during the RI consists of the Environmental Evaluation (EE) and the Human Health Risk Assessment (HHRA). The purpose of the Baseline Risk Assessment is to identify and characterize the levels and toxicity of the hazardous substances present, the fate and transport of contaminants, the potential for exposure to contaminants, and the risk of potential threats to human health and the environment. The Baseline Risk Assessment is used as the basis for determining the need for remedial action.

After data collection and analysis are complete, treatability studies are conducted. These studies, which can be part of the RI or the FS, determine the technical feasibility of remedial alternatives, and the results of these studies are used in the FS. Treatability studies include laboratory and field tests conducted for the purpose of providing sufficient data to (1) allow evaluation of treatment alternatives and (2) support remedial design of the selected alternative.

If sufficient data are available, treatability studies may be initiated as soon as the RI program begins. The laboratory test portion of the treatability study may require significant time; to ensure timely completion of the RI/FS, laboratory testing may be started before the FS begins. Successful completion of treatability studies is dependent on the initial data available and on data collected during the RI field investigations. Occasionally, additional data are needed for the treatability study; these data needs must be determined as early as possible in the process.

Feasibility Study

During the FS, remedial alternatives are developed and screened in the following steps:

1. Identify potential treatment technologies and containment/disposal requirements of residuals or untreated waste

2. Evaluate technologies

3. Identify action-specific ARARs

4. Assemble technologies into alternatives

5. Screen alternatives as necessary for feasibility of application

The FS process eliminates unsuitable remedial options from the extensive list of possible remedies. The initial list of remedial options may include potential alternatives that incorporate emerging technologies as well as those used successfully at other sites. After alternatives are developed and screened, the remaining alternatives are subjected to detailed analysis on the basis of the following nine criteria before they are presented to the regulatory agency:

1. Protection of human health and the environment

2. Compliance with ARARs

3. Long-term effectiveness and permanence

4. Reduction of toxicity, mobility, or volume through treatment

5. Short-term effectiveness

6. Implementability

7. Cost-effectiveness

8. State acceptance

9. Community acceptance

If additional contamination is detected during the RI/FS process, or if the RI/FS did not eliminate enough uncertainties about the site, a Phase II RI/FS may be conducted. The Phase II RI/FS is conducted in the same manner as the Phase I RI/FS except that the Phase II RI/FS relies on data generated during the Phase I RI/FS for the scoping process.

The Phase I RI/FS may also be followed by an Interim Remedial Action (IRA), which is a remedy to immediately address contamination that may pose a near-term threat to human health or the environment. An IRA may be implemented at any time during the RI/FS process and is often implemented concurrently with the continuing RI/FS process.

Remedy Selection and Design/Implementation of Remedial Action

Following detailed analysis of remedial alternatives, the regulatory agency recommends a remedial alternative. This recommendation is part of the Record of Decision (ROD), which may also contain other information, conclusions, and requirements for site cleanup. If the site is owned by a federal agency, that agency issues the ROD after the regulatory agency has received the recommended remedial alternative.

Remedial design and implementation normally occur after issuance of the ROD; however, where the preferred alternative is obvious, the remedial design phase may begin, with regulatory agency approval, prior to issuance of the ROD.

Design and implementation of the selected remedy consists of (1) remedial design, (2) construction, (3) remedial action, and (4) monitoring. After the remedial alternative has been selected, remedial design may begin. The design process is conducted in a phased approach, allowing input and oversight by regulatory agencies. After the agencies approve the final design, construction takes place. Remedial action consists of actual treatment of the contaminated media, which may take many years to complete. The site is monitored during and after remedial action to ensure that the spread of contamination has been stopped and that existing contamination is being cleaned up.

3.2.2 RCRA Corrective Action Process

RCRA, as amended by the Hazardous and Solid Waste Amendments (HSWA), requires corrective action for any release of hazardous waste or hazardous constituents from solid waste management units at hazardous waste treatment, storage, or disposal facilities. The mechanism for achieving the corrective action is the RCRA corrective action process, which parallels the CERCLA RI/FS process. The RCRA corrective action process incorporates the following components (parallel CERCLA process components are in parentheses):

- RCRA Facility Assessment (Scoping)
- Interim Corrective Measure (Interim Remedial Action)
- RCRA Facility Investigation (Remedial Investigation)
- Corrective Measures Study (Feasibility Study)
- Corrective Action Selection and Corrective Measures Implementation (Remedial Design and Construction)

Each of these components is briefly described below.

RCRA Facility Assessment

The RCRA Facility Assessment is conducted by the regulatory agency for each facility requesting a RCRA permit. Information gained during the RCRA Facility Assessment may indicate that hazardous waste is contaminating the site, in which case the RCRA Facility Assessment can lead to an RFI/CMS or Interim Corrective Measure (ICM). The RCRA Facility Assessment is similar to the scoping stage of the RI/FS process, where the initial problem is identified and RFI/CMS objectives are defined.

RCRA Facility Investigation

The RCRA Facility Investigation (RFI) is parallel to the CERCLA RI and is conducted by the owner/operator under a permit schedule, compliance order, or enforcement order detailing the schedule and specific activities. Site characterization includes identifying the type and concentration of hazardous material and determining whether or not a release has occurred. If a release is detected, studies determine where the hazardous material is moving

and how fast. After the contamination has been characterized, the regulatory agency determines the necessity of performing the CMS. Treatability studies may be performed as part of the RFI, serving the same function as in the CERCLA RI. The RFI also includes a Baseline Risk Assessment; however, it is not divided into environmental and human health components. An ICM, similar to a CERCLA IRA, may be conducted at any time during the RFI if it is determined that adverse exposure to hazardous materials could occur in the short term.

Corrective Measures Study

Information gathered during the RFI is used during the Corrective Measures Study (CMS) to identify the type of corrective action needed. As in the CERCLA FS process, treatability studies may be conducted as treatment alternatives are evaluated.

Corrective Action Selection and Corrective Measures Implementation

After the CMS has been conducted, the corrective measure is selected by the regulatory agency after careful evaluation of RFI/CMS conclusions and public comments. This decision is called the Corrective Action Decision (CAD). After the regulatory agency issues the CAD, the Corrective Measures Implementation (CMI) begins. The CMI includes design, construction, operation, monitoring, and maintenance of the corrective measure.

3.3 IMPLEMENTATION OF THE RCRA/CERCLA PROCESS AT ROCKY FLATS

3.3.1 Interagency Agreement

In order to establish a common basis of understanding and to integrate the requirements of federal regulators with those of the Colorado Department of Health (CDH), an Interagency Agreement (IAG) was negotiated between DOE, EPA, and CDH and signed on January 22, 1991. The IAG document is available to the public at any of the DOE information repositories (see Appendix C). The purpose of the IAG is to establish a legally enforceable framework to facilitate coordination of cleanup and oversight efforts and to standardize requirements. The IAG establishes specific milestones and time frames for remedial actions as well as penalties for noncompliance with the agreement.

This agreement establishes the parameters for cleanup of potential radioactive, hazardous, and mixed waste contamination resulting from past operations at Rocky Flats at the 177 Individual Hazardous Substance Sites (IHSSs). The goal of the Rocky Flats Environmental Restoration Program is to remediate sites so that they can be released as "clean."

Rocky Flats, in consultation with EPA/CDH and in response to public comment, prioritized the original 177 inactive IHSSs into 16 operable units (see Figures 10 and 11 and Appendix D).

Three factors are considered in assigning an IHSS to a particular OU: (1) geographic location, (2) type of contaminant involved, and (3) relative priority of the IHSS. Given these factors, there is considerable overlap of the OU boundaries.

Map of Operable Units 1 - 8
Figure 10

Map of Operable Units 9 - 16
Figure 11

The priorities for Rocky Flats OUs were established through the IAG. DOE/EG&G technical staff, EPA, and CDH initially prioritized the OUs on the basis of available technical information, but subsequent public comment on the IAG provided input from surrounding communities that resulted in modification of the priorities (e.g., OU 3 - Offsite Areas was assigned a higher priority). Assessment, characterization, and remedial activities for IHSSs are carried out by OU. The OUs form the basis for planning, scheduling, budgeting, and prioritizing environmental restoration activities. Contamination at the OUs is being assessed, and cleanup activities are being undertaken, with higher risk sites being addressed before lower risk sites.

The IAG framework established the joint EPA, CDH, DOE agreement for the administration of RCRA and CERCLA remediation at Rocky Flats. DOE, EPA, and CDH recognized that the two regulatory agencies could potentially impose conflicting requirements on DOE, given the overlap of respective authorities under RCRA and CERCLA.

For purposes of the IAG, EPA and CDH established a joint review of each OU. The "lead" regulatory agency is assigned according to the RCRA or CERCLA designation of that OU. (Note: The IAG established joint lead agency oversight for OUs 1, 2, and 8.) The agency not assigned direct authority serves as the "support" regulatory agency. DOE, EPA, and CDH recognize the need for, and the benefits derived from, joint agency review.

RCRA provides that states may regulate hazardous waste through EPA-approved state programs. CDH has been granted authority to regulate RCRA sites under the CHWA and is the lead agency for most RCRA activities at Rocky Flats. EPA is the lead agency for the other ten OUs.

The designation of a lead regulatory agency for each OU is based on the effective date of the 1980 RCRA regulations. Sites that were operating at the time that these regulations went into effect required interim status under RCRA to continue operation and are therefore under CDH jurisdiction. At Rocky Flats, the following are interim status units: Solar Evaporation Ponds, West Spray Field, Present Landfill, Original Process Waste Lines, and other smaller IHSSs grouped into the Other Outside Closures and Inside Building Closures OUs. Sites that were inactive at the time that RCRA regulations went into effect are OUs under EPA jurisdiction.

In FY92, CDH and EPA reassigned several IHSSs among the OUs based on recent technical information and data analysis. These changes involve the consolidation of IHSSs associated with the Original Process Waste Lines to OU 9.Given the dynamic nature of environmental restoration activities, the number of IHSSs may change, as sites may be added or removed. Sites may be added if previously unidentified potential contamination is discovered or may be removed as technical analysis indicates that the site no longer presents a risk to public health or the environment.

Table 2 lists OU designations, site grouping, the number of IHSSs, and the lead regulatory agencies for Rocky Flats OUs.

Table 2

Summary of Operable Units at Rocky Flats

OU	Site Grouping	No. of IHSSs	Lead Agency
OU 1*	881 Hillside	11	EPA and CDH
OU 2*	903 Pad, Mound, and East Trenches	20	EPA and CDH
OU 3	Offsite Releases	4	EPA
OU 4	Solar Evaporation Ponds	1	CDH
OU 5	Woman Creek	10	EPA
OU 6	Walnut Creek	21	EPA
OU 7	Present Landfill	2	CDH
OU 8*	700 Area	24	EPA and CDH
OU 9	Original Process Waste Lines	21	CDH
OU 10	Other Outside Closures	15	CDH
OU 11	West Spray Field	1	CDH
OU 12	400/800 Area	11	EPA
OU 13	100 Area	14	EPA
OU 14	Radioactive Sites	8	EPA
OU 15	Inside Building Closures	7	CDH
OU 16	Low-Priority Sites	7	EPA
	Total	177	

* Per the IAG, EPA/CDH oversight has been established.

3.3.2 Environmental Restoration Schedules

The IAG sets forth a set of interdependent activities that must be performed in a particular sequence. Planning and performance of these activities is managed through a detailed work schedule.

This schedule, which consists of a program management network with over 5,000 activities, was developed to define the work and associated milestones to be accomplished under the requirements of the IAG and to establish the FYP budget requirements. Each OU defined by the IAG has an Activity Data Sheet (ADS) (described in Section 1.2.1) for assessment and remediation. Detailed information on the IAG schedule is available in the IAG schedule document, which is available at the information repositories listed in Appendix C.

3.3.3 NEPA Integration with CERCLA and RCRA

NEPA requires that federal agencies consider the impact of their actions on human health and the environment. NEPA requirements are intended to ensure that reasonable alternative courses of action are identified and that the environmental consequences of

proposed actions are investigated. NEPA requires that an Environmental Impact Statement (EIS) be prepared for major federal actions that may significantly impact the environment. The necessity of preparing an EIS is typically determined during the Environmental Assessment (EA). At Rocky Flats, NEPA requirements are met by conducting an EA for OUs that may require a remedial action. As agreed in the IAG, EAs at Rocky Flats are conducted in parallel with ongoing work to prevent any impact on the schedule for completion of the CERCLA and RCRA process.

NEPA also includes requirements for documentation of environmental reviews associated with hazardous substance remedial action projects. DOE issued Notice 5400.4, Integration of Environmental Compliance Processes (DOE Headquarters, 1988), which establishes the policy for meeting the requirements of NEPA and the CERCLA and RCRA processes for activities under CERCLA and RCRA. This policy is intended to integrate the requirements of NEPA with the planning and environmental review procedures of the CERCLA and RCRA processes so that all such procedures run concurrently rather than consecutively.

3.3.4 RCRA and CERCLA Processes at Rocky Flats

RCRA and CERCLA processes at Rocky Flats are similar in that both types of investigations include scoping, fieldwork, characterization of the nature and extent of contamination, and risk assessment. In accordance with the IAG, each OU must comply with the provisions of both RCRA and CERCLA. Therefore, the investigative phase at each OU is referred to as an RI/RFI, and the selection of remedial alternatives is referred to as an FS/CMS.

The RI/RFI and FS/CMS processes also are dependent on data generated during sitewide studies. The FS/CMS, which includes treatability studies and evaluation of remedial alternatives, depends on sitewide treatability studies to expedite the FS/CMS. The purpose of sitewide treatability studies is to evaluate potentially applicable treatment technologies for media (air, water, soil) at Rocky Flats that are anticipated to require treatment. These treatment technologies will be used as candidate technologies in the OU-specific treatability studies. Early identification of these candidate technologies results in increased efficiencies and potential cost savings within each OU. Waste generated by environmental restoration activities will be managed by the appropriate waste management orgranization.

Scoping

Scoping studies are initiated approximately two months prior to initiating preparation of an RI/RFI work plan. The primary purpose of scoping is to provide information for preparing the OU site description document, a key element of the RI/RFI work plan. As part of the scoping study, existing data and some nonintrusive field data may be gathered and analyzed for use in the site description document. Data analysis and evaluation are also used in determining whether any interim response actions are required for the OU under investigation. Existing data at Rocky Flats may be found in the Historical Release Report, Background Geochemical Characterization Report, sitewide EIS, other RI/RFI and FS/CMS reports, sitewide surface water and groundwater monitoring reports, risk assessments, and other project-specific documents.

Work Plans

Work plans for all OUs to be assessed and characterized under the RI/RFI and FS/CMS processes are prepared by Rocky Flats and are approved by EPA/CDH before fieldwork begins. Work plans contain information describing the OU and details of (1) field activities and sampling plans, (2) analytical requirements, and (3) data management, evaluation, and reporting procedures.

The time required for preparation and approval of a typical work plan is currently estimated at 16 months; in the first 9 months, an initial draft work plan is prepared and submitted for EPA/CDH review. Draft plans are prepared by EG&G and its subcontractors, reviewed by DOE, and revised for submittal to EPA/CDH. After EPA/CDH review, comments are incorporated into a second revision, and the plan is again submitted to EPA/CDH for approval. As the work plan for each OU is being developed, the schedule for RI/RFI and FS/CMS activities is revised to reflect newly identified requirements for that OU, provided that an IAG milestone is not affected.

Remedial Investigation/RCRA Facility Investigation)

An RI/RFI as defined by its work plan, will be conducted for each OU. Investigations are carried out in one or more phases. The Phase I RI/RFI includes (1) radiation surveys, (2) surveying and mapping the OU, and (3) collection and analysis of samples of air, surface soils, groundwater, surface water, and other applicable media. As the data are received and analyzed, they are incorporated into the Rocky Flats Environmental Data System for access and use in the analytical phase. Phase I RI/RFI data and the results of the data analysis are reported and used in the Phase I FS/CMS to determine the need for additional data and as a basis for the Phase II RI/RFI work plan, if required.

If additional data are needed, a Phase II work plan supplement is prepared for EPA/CDH review and approval. At the conclusion of the Phase II RI/RFI, DOE prepares a report for EPA/CDH review and approval for each OU with a Phase II work plan supplement.

Feasibility Study/Corrective Measures Study

An FS/CMS, as defined by its work plan, will be conducted as necessary for each OU. In all cases, the study activities will follow the IAG and the CERCLA (or RCRA) guidance published by EPA.

The RI/RFI and FS/CMS processes are conducted essentially in parallel, as the FS/CMS begins during RI/RFI fieldwork activities. The data collected in the RI/RFI influence the development of remedial alternatives in the FS/CMS, which can in turn affect data needs for the treatability studies. The purpose of the Phase I FS/CMS is to define cleanup objectives and develop and screen remedial alternatives. The most appropriate remedial alternatives for a site are selected through a comparative analysis of each option, based on effectiveness, implementability, and cost. The selected alternatives undergo further evaluation during the remedy selection process.

In many cases at Rocky Flats, multiple RI/RFI sequences are required. This results in Phase I and Phase II RI/RFI sequences occurring for each OU (e.g., a Phase I investigation specifically addressing soil contamination and a Phase II investigation addressing surface water and groundwater contamination). The Phase II FS/CMS builds on data from the Phase I and Phase II RIs/RFIs and continues to serve as the mechanism for development, screening, and detailed analysis of remedial alternatives.

Proposed Plan/Responsiveness Summary

DOE will submit a draft proposed plan simultaneously with submittal of the final FS/CMS report. The draft proposed plan summarizes the alternatives and details the implementation plans for the remedy selected. The IAG mandates a two-month public comment period on the draft proposed plan and final FS report to solicit input from the public. At the end of the comment period, the Responsiveness Summary is prepared and submitted for agency review. EPA, CDH, and public comments on the FS/CMS report and draft proposed plan are addressed in the final proposed plan.

Record of Decision/Corrective Action Decision

Upon approval of the proposed plan and after public comment, DOE, in conjunction with the regulatory agencies, prepares and issues a Record of Decision (ROD)/Corrective Action Decision (CAD) so that remedial actions for the OU can proceed under CERCLA and RCRA requirements. The ROD/CAD, which is based on the proposed plan, documents the remedy selection process, the decision on the proposed project, and the rationale for the decision. Issuance of the ROD/CAD is a milestone for each OU in the IAG.

3.4 ENVIRONMENTAL RESTORATION ACTIVITIES AT ROCKY FLATS

Environmental restoration activities have been initiated for most OUs at Rocky Flats. Brief descriptions of the units funded in FY93 are included in this section.

3.4.1 Operable Unit 1 - 881 Hillside (ADS #1001)

The 881 Hillside area (OU 1) was designated as the highest priority site because of the elevated concentrations of volatile organic compounds (VOCs) in groundwater and the proximity of the site to a surface water drainage (Woman Creek). A map of the 881 Hillside area is provided in Appendix D.

OU 1 was designated as a CERCLA Past Practice Unit because most of the contamination at the site resulted from past waste management practices. Scoping for the RI/RFI and cleanup of OU 1 included a review of available historical information pertaining to the 881 Hillside area in addition to information generated during several sitewide studies. Eleven IHSSs within the 881 Hillside area were identified in two 1986 sitewide studies and in the IAG.

The Phase I RI/RFI was initiated in March 1987 to determine the exact nature of contamination at OU 1. The RI/RFI consisted of preparation of detailed topographic maps,

radiometric and organic vapor screening surveys, surface geophysical surveys, a soil-gas survey, a well boring program, soil sampling, and groundwater and surface water sampling. In 2 of the 11 IHSSs in OU 1, the concentrations of organic chemical contamination warranted concern. Alluvial groundwater in the area immediately east of Building 881 (IHSS 119.1) was found to be contaminated with various VOCs. Contamination was also detected in the area of the outfall of the foundation drain for Building 881 (IHSS 107). This information was included in a draft of the RI/RFI report submitted to EPA/CDH on July 1, 1987. Identification of VOCs in these IHSSs necessitated additional study, which was carried out in the Phase II RI/RFI. Data from additional drilling and the responses to EPA and CDH comments were incorporated into the draft Phase II RI/RFI report submitted to CDH and EPA on March 1, 1988.

In the Phase I FS/CMS, which was also initiated in 1987, information from the initial RI/RFI was incorporated, the need for remedial action was evaluated, and a technical analysis of the possible remedial actions that could be taken to eliminate or contain contamination was performed. The report stated that there was no imminent threat to public health or the environment from contaminants at the 881 Hillside area. However, the travel time for a contaminant to reach the property boundary was estimated to be on the order of 80 years, and the risk assessment included in the study documented that under these conditions, an unacceptable risk could be posed to the public by consumption of contaminated alluvial groundwater.

DOE proposed an IRA/ICM to minimize the release of hazardous substances from the 881 Hillside area while the selection process for the final remedial action is under way. The IRA/ICM prevents contaminated groundwater from reaching Woman Creek. The IRA/ICM plan includes (1) a new collection well in the vicinity of well 9-74, (2) a new foundation outfall sump at the existing foundation drain for Building 881, and (3) a French drain constructed across the base of the 881 Hillside area. Contaminated water collected from these three sources is pumped to a newly constructed treatment facility for processing and treatment.

ARARs were identified for each component of the IRA/ICM. Applicable regulations included those associated with groundwater treatment and subsurface discharge (such as the requirements of the Colorado Water Quality Control Act), relevant and appropriate requirements under RCRA for storage and treatment of hazardous waste, and CDH siting criteria for RCRA hazardous waste disposal sites.

An EA for the IRA/ICM was prepared to fulfill NEPA requirements. The EA investigated the impacts of the IRA/ICM on air and water quality, animal and plant life, site archeology, short- and long-term land productivity, risks of exposure to workers and members of the general public during routine operations, and risks due to accidental exposure. The final report was submitted to EPA/CDH on May 5, 1989, and a Finding of No Significant Impact (FONSI) was issued.

Construction of the 1,450-foot-long French drain was completed in April 1992. This drain is located downgradient of contaminated groundwater of the OU 1 IHSSs. An impermeable barrier was constructed on the downstream face of the drain, with a piping system located on the upstream side to collect contaminated groundwater (see Figure 12). Monitoring wells are being installed to assess the effectiveness of the groundwater collection system. Collected water is pumped to an onsite treatment facility for removal of organic and inorganic compounds. The treatment facility destroys organic compounds using an ultraviolet light/hydrogen peroxide oxidation system and removes inorganic compounds with an ion-exchange system. The treated water will be released to the South Interceptor Ditch, which drains into pond C-2. Water that collects in pond C-2 will be held for sampling and analysis and will be treated, if necessary, before transfer to the Broomfield Diversion Ditch, bypassing Great Western Reservoir.

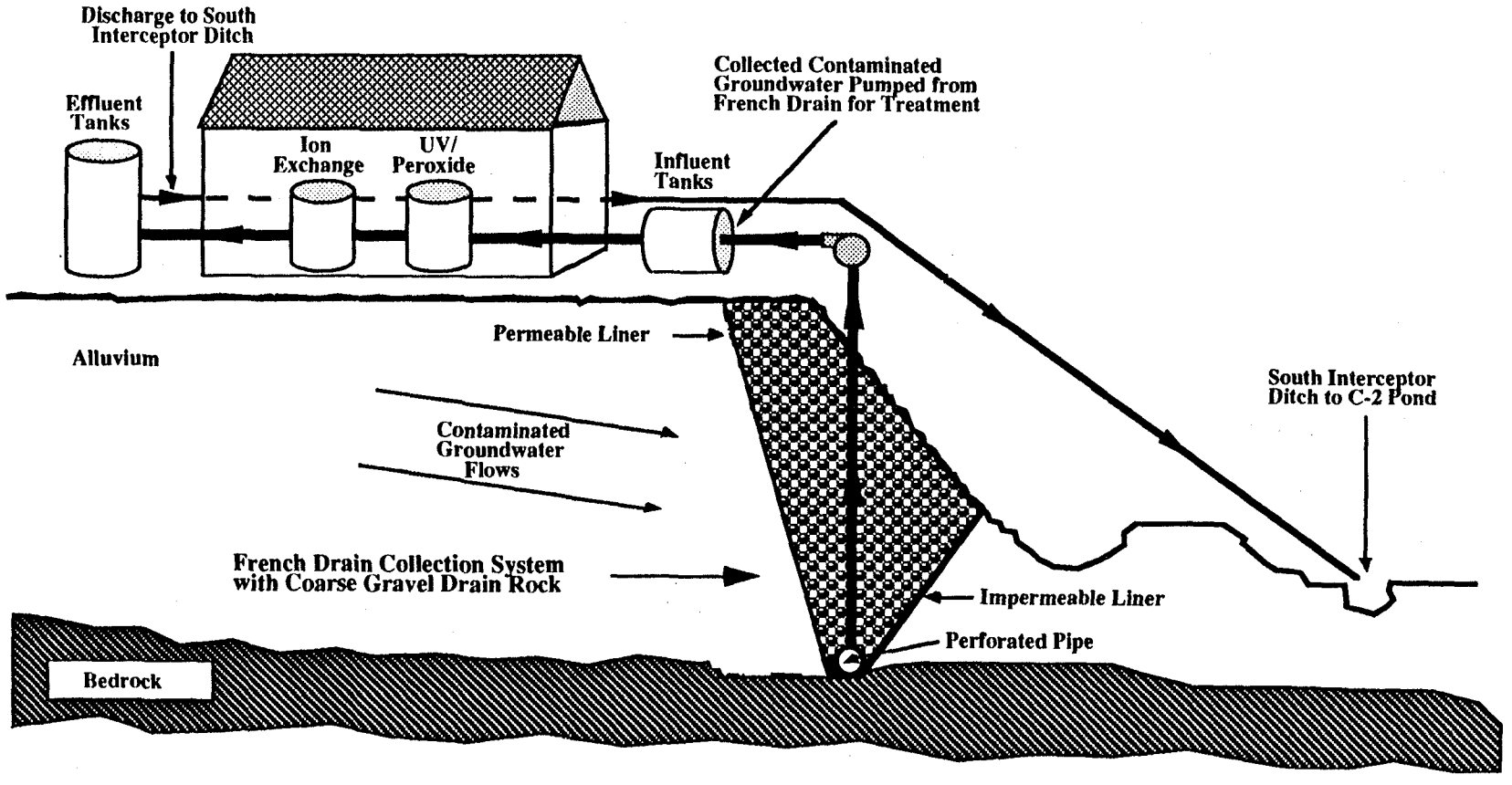
Concurrent with construction of the IRA/ICM, a Phase III RI/RFI cycle was initiated to further verify data collected in the Phase I and II investigations. The existence of inorganic contamination in either alluvial or bedrock groundwater had not been determined because of a lack of information on the naturally occurring background levels of inorganic compounds in this type of environment. Therefore, plans for the Phase III studies included background monitoring of inorganic compounds to aid in determining whether inorganic contamination exists in the 881 Hillside area. Some of the soil VOC data collected during the Phase I and Phase II investigations were inconclusive; collection of new and more extensive soil VOC data was included in the Phase III RI/RFI. The Phase III FS/CMS work plan, submitted in January 1990, included plans for evaluation of treatment and disposal options for contaminated soil if warranted by the results of the Phase III RI/RFI. Treatment alternatives for removal of inorganic contaminants are also being analyzed.

The following activities were accomplished in FY92:

- Completed IRA/ICM construction (treatment plant)
- Completed IRA/ICM construction (French drain)
- Began interim groundwater treatment program
- Completed RI/RFI drilling and sampling
  - Drilled 56 boreholes
  - Completed 23 active monitoring wells
  - Completed 16 monitoring wells, subsequently abandoned because of geologic conditions
- Began FS/CMS work

The following activities are planned for FY93:

- Submit final RI/RFI report for OU 1 in January 1993
- Submit draft FS/CMS report in the second quarter of FY93
- Submit final FS/CMS report in the fourth quarter of FY93; final approval expected in the first quarter of FY94
- Begin preparation of the remedial action plan in the third quarter of FY93
- Continue interim groundwater treatment program for the IRA/ICM through FY93



OU 1 881 Hillside
Interim Remedial Action/Interim Corrective Measure
Figure 12

The remedial action plan will be completed and the ROD will be issued in the third quarter of FY94. Remedial action design will begin during the fourth quarter of FY94. Design work, remedial action construction, and soil treatment will proceed in accordance with the IAG. Performance monitoring and assessment will occur after remedial action construction is complete.

3.4.2 Operable Unit 2 - 903 Pad, Mound, and East Trenches (ADS #1002)

A program of RI/RFI, FS/CMS, and remedial actions is under way at OU 2. The three areas (903 Pad, Mound, and East Trenches areas) are located on the eastern side of the site's security area. A total of 20 IHSSs are included in the three investigative areas.

Contamination of the 903 Pad and Mound areas is largely attributed to waste drum storage in the 1950s and 1960s. The waste drums corroded over time, allowing hazardous and radioactive materials to leak into the surrounding soil. Some additional contamination is thought to have resulted from wind dispersion during drum removal and soil movement activities. Rocky Flats studies have established that contaminants were transported by wind from the 903 Pad to OU 3.

The East Trenches area was used for disposal of plutonium- and uranium-contaminated waste and sanitary sewage sludge from 1954 to 1968. Two areas adjacent to the trenches were used for spray irrigation of sewage treatment plant effluent, some of which may have contained contaminants that were not removed by the treatment system.

Routine groundwater investigations at Rocky Flats to-date indicate the presence of VOCs in the shallow (alluvial) and bedrock groundwater systems in the vicinity of these sites. A portion of the surface water contamination results from seeps (areas where groundwater emerges at the surface). Most of the seeps are dry during some portions of the year. If not collected, water from the seeps eventually flows to either Walnut Creek or Woman Creek and then to a series of retention ponds. Water in the ponds is sampled prior to and during release. This water is then treated, if necessary, to ensure compliance with the Rocky Flats National Pollutant Discharge Elimination System (NPDES) permit and other applicable standards.

The spray irrigation areas have been designated as IHSSs partially because of the potential for chromium contamination resulting from a plant spill of chromic acid that entered the sanitary sewer on February 23, 1989. Sampling initiated by Rocky Flats in the spray irrigation areas indicated that leachable chromium concentrations in soils are significantly below RCRA limits. Additional contamination may include other metals and nitrates.

The Phase I RI/RFI was completed in April 1990. DOE, EPA, and CDH agreed to proceed with two separate IRAs/ICMs to address surface water seeps in South Walnut Creek and Woman Creek. The South Walnut Creek IRA/ICM was undertaken after an EA was performed and a FONSI was issued. The IRA/ICM plan contains research and development elements that will study methods to collect and remediate seep flows and surface water in the South Walnut Creek basin north of the Mound area. This facility includes temporary collection sumps, pumps, transfer pipelines, holding tanks, a trailer-

mounted granular activated carbon (GAC) filtration system to remove VOCs, and a trailer-mounted chemical precipitation/microfiltration system designed to remove metals and radionuclide contamination from the raw water collected (see Figure 12).

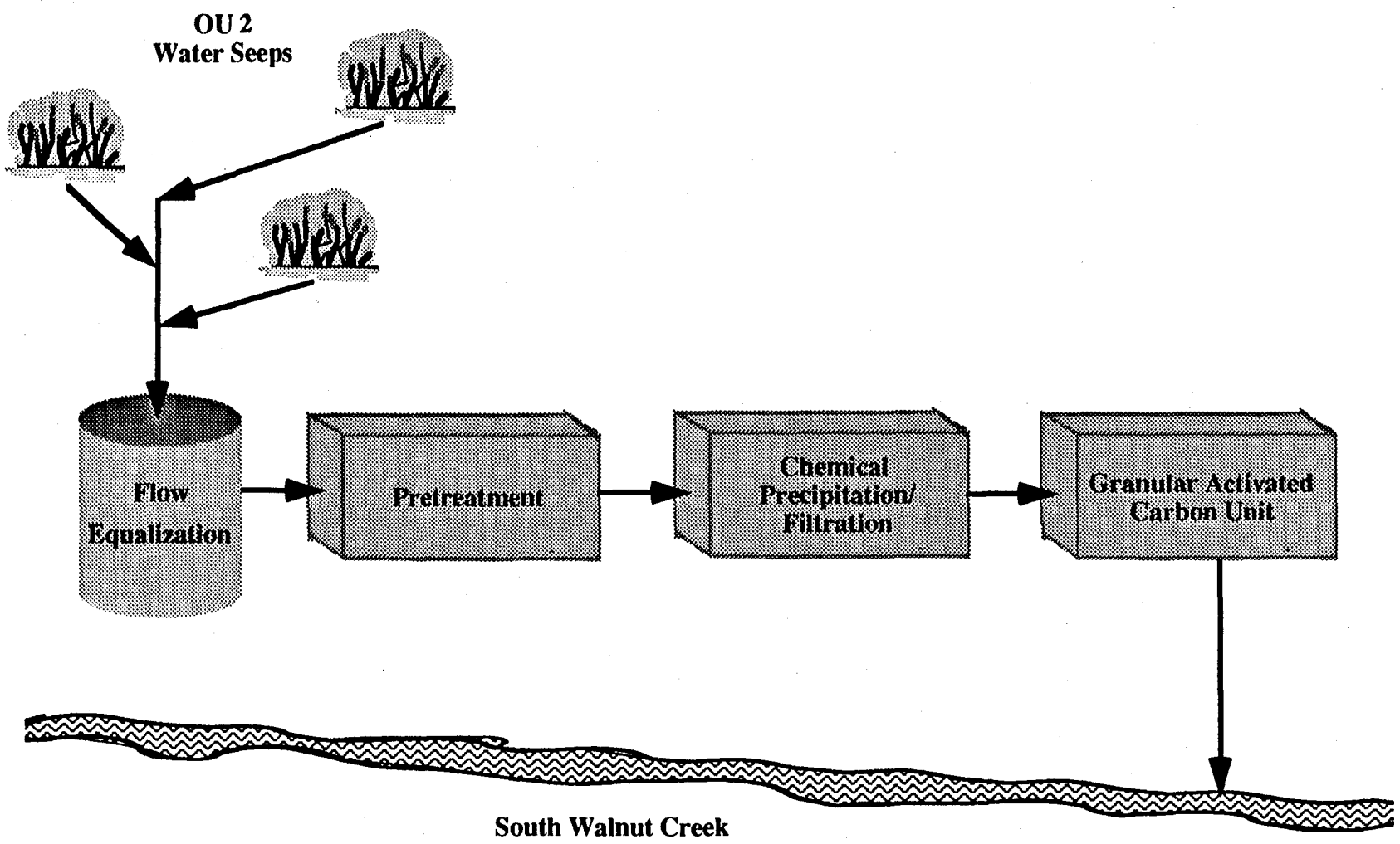
Treatment for VOCs via activated carbon began May 13, 1991, and has proven to be an effective system. The radionuclides removal system was added to the existing system and began operation in April 1992. The effectiveness of this system is being verified through laboratory and field treatability studies. The system intercepts water from one contaminated seep that flows into South Walnut Creek and also withdraws surface water from South Walnut Creek itself. After treatment, the water is returned to South Walnut Creek above the retention ponds.

The draft Woman Creek IRA/ICM plan proposed the "no action" alternative for collecting and treating VOCs, metals, and radionuclides from the seep areas. The document was submitted to EPA/CDH October 2, 1991, and was rejected. DOE, EPA, and CDH agreed to revise the scope of the action and conduct a subsurface investigation of the 903 Pad, Mound, and East Trenches. The probable treatment would be vapor extraction for VOCs in the unsaturated and saturated zones of these areas. The draft subsurface investigation IRA/ICM plan was submitted to EPA/CDH for review and comment on March 2, 1992. This document is available in the DOE information repositories. The draft EA for the Woman Creek IRA/ICM was submitted concurrently.

The Phase II RI/RFI work plan (alluvial) for OU 2 was approved by EPA/CDH in May 1990. A total of 101 monitoring wells and 46 boreholes have been installed for the assessment field program. Drilling was completed in May 1992. The draft Phase II RI/RFI work plan (bedrock) was submitted in early FY91, and the final was approved in June 1991. The bedrock field program is scheduled to begin in FY94.

The following activities were accomplished in FY92:

- Submitted South Walnut Creek final treatability test report (Phase I GAC) on June 2, 1992
- South Walnut Creek GAC IRA/ICM system collected and treated over 3.3 million gallons of water
- Completed field treatability unit test program (Phase I GAC)
- Fabricated, installed, and started up South Walnut Creek radionuclides removal system
- Completed radionuclides removal system treatability test report
- Submitted Woman Creek draft subsurface investigation IRA/ICM plan to EPA/CDH on March 2, 1992
- Obtained EPA/CDH approval of OU 2 Phase II RI/RFI work plan (alluvial)
- Completed Phase II RFI/RI alluvial drilling:
  - Drilled 4,635 linear feet (through May 1992)
  - Completed 101 monitoring wells (completed program)
  - Drilled 46 boreholes (completed program)
- Completed OU 2 RI/RFI fieldwork in May 1992
- Began compilation and analysis of field data for the Phase II RI/RFI report (alluvial)



South Walnut Creek
Interim Remedial Action/Interim Corrective Measure
Figure 13

The following activities are planned for FY93:

- Continue ongoing operation of South Walnut Creek field treatability study; prepare and finalize treatability study report
- Continue Woman Creek subsurface investigation project, with development and preparation of test plans for each OU 2 site (903 Pad, Mound, and East Trenches); each test plan to focus on more detail as it relates to observational approach and detailed design
- Complete regulatory agency review and comment on the draft Phase II RI/RFI report (alluvial)
- Begin preparation of the final Phase II RI/RFI report (alluvial)
- Begin preliminary identification of OU 2 ARARs

As a result of changes in the scope and schedule of the Phase II RI/RFI subsequent to funding allocations, the IAG milestones for submittal of the draft and final Phase II RI/RFI reports (March 12, 1993, and August 3, 1993, respectively) may not be met. Phase II RI/RFI (bedrock) field and laboratory activities for OU 2 will begin and be completed in FY94. Drilling activities and monitoring wells are to be completed in FY94. An FS/CMS report will be initiated. The EA for final treatment option(s) will be conducted in FY94. Also in FY94, the Woman Creek subsurface investigation IRA/ICM project will continue with a functional design, fabrication, and installation of each site project.

Preparation of the final FS/CMS report, remedial action design and construction, and issuance of the ROD will occur in FY95 and beyond.

3.4.3 Operable Unit 3 - Offsite Areas (ADS #1011)

OU 3 activities involve assessment of radionuclide contamination of offsite areas, including land surface (IHSS 199), Great Western Reservoir (IHSS 200), Standley Lake (IHSS 201), and Mower Reservoir (IHSS 202). Land surface contamination resulted from the dispersion of airborne contaminants from the 903 Pad. Contamination of Great Western Reservoir sediments resulted from re-engineering of the Walnut Creek containment pond dams.

The priority of remediation of the Offsite Areas has been elevated (changed from OU 10 to OU 3), reflecting the public concern voiced during public comment on the IAG.

In addition to the commitments made under the IAG, a 1985 out-of-court lawsuit settlement, *McKay v. United States,* mandates remediation and revegetation of approximately 350 acres of IHSS 199 (Jefferson County remedial action lands). Remediation and revegetation activities are currently required on approximately 200 of the 350 acres covered under the lawsuit agreement. Remedial activities are not required on the remaining 150 acres until requested by the owner. Of the total acreage, 100 acres are in active remediation and revegetation. In 1991, approximately 80 acres of disturbed soil from the 1985 remediation tilling were revegetated with native seed mix and mulched to protect the soil surface. Monitoring for revegetation effectiveness and weed competition will occur during 1992. Semiannual reports to the landowners are written in January and July on Settlement Agreement activities.

The following activities were accomplished in FY92:

- Submitted final Phase I RI/RFI work plan on December 6, 1991
- Resolved issues with EPA/CDH on the Phase I RI/RFI work plan in the second quarter of FY92
- Received agency approval of final Phase I RI/RFI work plan on March 13, 1992
- Initiated field activities, including access agreements
- Submitted required NEPA documentation to DOE-HQ
- Developed wind tunnel study to assess soil/sediment resuspension potential
- Began Phase I fieldwork (including sampling of soil, sediment, surface water, groundwater, and air)
- Began Phase I laboratory work
- Performed revegetation activities, such as weed and prairie dog control, on Jefferson County remedial action lands
- Delivered July semiannual report to Jefferson County (documenting remedial action activities)

The following activities are planned for FY93:

- Complete Phase I RI/RFI fieldwork and laboratory work
- Begin preparation of Phase I RI/RFI report
- Monitor revegetation success
- Deliver semiannual reports to Jefferson County

As a result of changes in the scope and schedule of the RI/RFI subsequent to funding allocations, the IAG milestone for submittal of the draft RI/RFI report (July 16, 1993) may not be met. The RI/RFI report presenting the results of fieldwork and laboratory analyses, the EE, and the HHRA will be submitted, reviewed, and approved in FY94. After approval of the RI/RFI report, a final treatment option will be selected.

3.4.4 Operable Unit 4 - Solar Evaporation Ponds (RCRA Closure) (ADS #1258)

The Solar Evaporation Ponds consist of a series of five evaporation ponds located in the central portion of the site. Pond 207-A was placed into service in August 1956; ponds 207-B, North, Center, and South were placed into service in June 1960; and pond 207-C was placed into service in 1970. These ponds were formerly used for storage and treatment of liquid process wastes and other waste types. Placement of process waste material into these ponds ceased in 1986 as a result of changes in Rocky Flats waste treatment operations.

Interceptor trenches were installed downgradient of the ponds during the period from October 1971 to April 1974 to prevent natural seepage and pond leakage from entering North Walnut Creek. In April 1981, this system was replaced by the current Interceptor Trench System (ITS). Site studies in the area indicate that groundwater flows northeast from the ponds area toward the North Walnut Creek drainage. The ITS was constructed to capture groundwater flowing from the ponds area prior to reaching North Walnut Creek. The ITS has been effective in collecting groundwater in the alluvium and surface water runoff.

The Solar Evaporation Ponds are RCRA interim status regulated units that are currently inactive. Leakage from the ponds has contaminated soils and groundwater with VOCs, heavy metals, and radioactive material. A closure plan submitted to the regulatory agencies on July 1, 1988, called for in-place closure of contaminated liners and subsoils. A proposal was submitted to the regulatory agencies in February 1989 to modify the closure plan for removal of contaminated liners and subsoils to achieve residual contaminant concentrations protective of human health. Closure activities include dewatering the impoundments; removing, solidifying, and disposing the pond sludges and sediments at the Nevada Test Site; and collecting and treating contaminated groundwater. Contaminated groundwater will be collected and treated to achieve compliance with 40 CFR 264.92, Groundwater Protection Standards.

Investigations to characterize the extent of subsurface soil and groundwater contamination and a risk assessment to determine the need to remove liner material and soil to achieve acceptable residual contaminant concentrations are being conducted concurrently with closure activities.

DOE's proposed cleanup action involves an initial partial closure of the ponds in order to eliminate the flow of contaminants into groundwater and soil. The method of action calls for evaporation of the pond water (approximately 6 million gallons) and sludge removal. Sludge removed from the ponds and solidified with Portland cement (referred to as "pondcrete") will be transported to the Nevada Test Site. The CDH Agreement in Principle (AIP) has significantly accelerated activities for pondcrete disposal. These clean up activities are detailed below.

The ponds will be dewatered by natural evaporation, enhanced natural evaporation, and forced evaporation. Enhanced evaporation will be achieved by (1) adding a nontoxic dye to the water to promote increased solar heat absorption and (2) utilizing heater/soaker pipes, which increase the surface area for evaporation. Forced evaporation will be achieved by utilizing the Building 374 evaporation system and portable evaporator units. The forced evaporation method will be used for water collected by the ITS and residual water produced by precipitation. Concentrate from the evaporator processes will be solidified and is currently planned for disposal at the Nevada Test Site. After dewatering, sludge from the ponds will be removed, mixed with cement, and poured into plywood half-boxes (external container volume of 56 cubic feet, internal container volume of 36 cubic feet). An estimated 11,900 half-boxes of new and reprocessed pondcrete will be produced from this effort. Pondcrete is currently stored on the 750 and 904 Pads.

After sludges and sediments have been removed from the pond areas, temporary measures will be employed to prevent erosion of the sidewalls and additional leaching of contaminants through the soil. These measures include forced evaporation of collected precipitation and will be in place until final closure activities are under way.

Pondcrete will be transported in containers approved by the U.S. Department of Transportation (DOT) to the Nevada Test Site. The waste will meet Nevada Test Site waste acceptance criteria, which prohibit the presence of free liquids and fine particles. To ensure that pondcrete meets low-level mixed waste acceptance criteria, the waste will be

processed using a process control plan and tested to certify compliance. Solidification and stabilization with cement is EPA's Best Demonstrated Available Technology for this type of waste. More than 6,000 boxes of pondcrete have already been shipped to the Nevada Test Site.

Following removal and solidification of pond sludge, previously processed pondcrete that did not conform to waste acceptance criteria will be reprocessed and repackaged. The reasons for the inconsistent quality of pondcrete processed before 1988 have been reviewed and the "lessons learned" have been applied to development of the current approach. The present subcontractor was selected specifically for cementation expertise. The formality of the approach to solidifying pondcrete has been significantly increased beyond that of the previous effort. Waste characterization has been increased to include all parameters affecting certification and cementation, and the resulting knowledge has been used to conduct laboratory-scale treatability studies to verify that the waste meets acceptance criteria. Furthermore, proof of product quality will be demonstrated in the subcontractor's laboratory in a bench-scale test. Finally, prior to production, a full-scale pilot test will be conducted.

The following activities were accomplished in FY92:

- Submitted final Phase I RI/RFI work plan on November 26, 1991
- Completed construction of heater/soaker pipes, installation of portable evaporators, construction of temporary storage tanks for water from the ITS, and rerouting of water collected by the ITS to the temporary storage tanks
- Began operation of forced evaporation systems
- Dewatered Solar Evaporation Ponds to levels necessary for pond sludge removal, and began processing of pond sludge to pondcrete

The following activities are planned for FY93:

- Submit draft Phase I RI/RFI report
- Complete processing of pond sludge to pondcrete
- Reprocess noncertifiable pondcrete

The final Phase I RI/RFI report will be prepared in FY94. Shipment of pondcrete will begin in FY95, assuming the availability of Nevada Test Site. An IRA/ICM will be selected in FY95, and construction of the IRA/ICM will begin in FY98.

3.4.5 Operable Unit 5 - Woman Creek (ADS #1005)

This activity encompasses assessment and remediation of ten IHSSs in the Woman Creek drainage. Possible contamination in this OU was caused by landfill operations, storm water runoff into holding ponds, and ash pit operations.

The OU 5 RI/RFI work plan is currently being developed, and the existing surface water and sediment data acquired since 1989 are being re-evaluated. The purpose of the study is to reduce the surface water and sediment sampling required by the RI/RFI work plan without impacting the quality of the RI/RFI.

The following activities were accomplished in FY92:

- Submitted revised final Phase I RI/RFI work plan on August 30, 1991, and obtained EPA/CDH approval on February 27, 1992
- Began Phase I RI/RFI field activities
- Began Phase I RI/RFI laboratory activities

The following activities are planned for FY93:

- Continue Phase I RI/RFI fieldwork/laboratory activities
- Conduct EE and HHRA

The draft Phase I RI/RFI report is due in the first quarter of FY94 and will be finalized in late FY94.

3.4.6 Operable Unit 6 - Walnut Creek (ADS #1014)

This activity encompasses assessment and remediation of 21 IHSSs in the Walnut Creek drainage. Thirteen groundwater monitoring wells will be installed throughout OU 6 to monitor the alluvial aquifer. Five bedrock groundwater monitoring wells will be installed in the vicinity of North Walnut Creek during the OU 6 RI/RFI. To characterize the bedrock aquifer in the vicinity of the ponds, up to nine additional bedrock groundwater monitoring wells may be installed.

Sediment samples will be collected from the drainage in OU 6 to obtain data in areas where existing data are insufficient to adequately characterize the sediments. Sediment sampling has been proposed along each stream segment on North and South Walnut Creeks where additional characterization is needed. Based on a review of the data collected at the existing locations along the OU 6 drainage, sediment data are sufficient for many portions of OU 6; therefore, the sampling locations specified in the IAG have been reduced in those areas.

The surface soil sampling program has been modified so that the surface soil samples specified in the IAG will be obtained from the original surface of these units. Sample collection will involve boring through overlying fill material down to the original surface.

The following activities were accomplished in FY92:

- Submitted revised final Phase I RI/RFI work plan on September 16, 1991, and received conditional approval from EPA/CDH on February 27, 1992
- Began fieldwork and laboratory work

The following activities are planned for FY93:

- Continue Phase I RI/RFI fieldwork
- Continue laboratory work and data validation scheduled for completion by the fourth quarter of FY94

As a result of changes in the scope and schedule of the RI/RFI subsequent to funding allocations, the IAG milestone for submittal of the draft Phase I RI/RFI report (August 4, 1993) may not be met. Phase I RI/RFI fieldwork activities will be completed in the fourth quarter of FY94. Fieldwork will include quarterly sampling, laboratory analysis, and data validation. Preparation of the Phase I RI/RFI report will begin in FY94. After approval of the final report, determination of a final treatment option and construction will commence.

3.4.7 Operable Unit 7 - Present Landfill (ADS #1255)

The Present Landfill (OU 7) is located north of the plant complex on the western side of an unnamed tributary of North Walnut Creek. OU 7 comprises two IHSSs. Soils beneath the landfill are potentially contaminated with leachate, sediments, and water from the East Landfill Pond. The Present Landfill began operation in August of 1968 and was originally constructed to provide for disposal of the plant's nonradioactive and nonhazardous wastes. In September 1973, tritium was detected in leachate from the landfill. A section in the southwest corner of the Present Landfill was used between 1986 and 1987 as a temporary storage area for hazardous waste. During the mid-1980s, extensive investigations were conducted on the waste streams (types) placed into the landfill to identify the hazardous wastes/hazardous constituents. Although currently operating as a nonhazardous sanitary landfill, the facility is considered an inactive hazardous waste disposal unit undergoing RCRA closure.

The following activities were accomplished in FY92:

- Completed revisions to the final Phase I RI/RFI work plan, and submitted plan on August 28, 1991
- Obtained EPA/CDH approval of work plan
- Completed RI/RFI fieldwork procurement package; contract awarded in preparation for FY93 start

The following activities are planned for FY93:

- Conduct RI/RFI fieldwork/laboratory work and data validation
- Begin IRA/ICM and RI/RFI report activities and continue into FY94 (including data analysis and draft report preparation, identification of ARARs, draft review, comment resolution, and report finalization)

The final Phase I RI/RFI report will be submitted in FY94. The IRA/ICM treatability study and the IRA/ICM EA will begin in FY94. Treatability studies will be conducted in FY94.

3.4.8 Operable Unit 8 - 700 Area (ADS #1006)

The 24 IHSSs in OU 8 encompass separate sites inside and around the production area of Rocky Flats. Contamination sources within the various IHSSs include aboveground and underground tanks, equipment washing areas, and releases inside buildings that potentially

affected areas outside the buildings. Contaminants from these sources may have been introduced into the environment through spills on the ground surface, underground leakage and infiltration, and in some cases through precipitation runoff. The chemical composition of the contaminants also varies widely between the IHSSs, ranging from low-level radioactive mixed wastes to nonradioactive organic and inorganic compounds.

The following activities were accomplished in FY92:

- Completed draft Phase I RI/RFI, EE, and HHRA work plans, and submitted plans to EPA/CDH on May 1, 1992
- Incorporated EPA/CDH comments into draft Phase I, EE, and HHRA work plans

The Phase I RI/RFI, EE, and HHRA work plans will be reviewed and approved in FY93.

All Phase I RI/RFI fieldwork and laboratory work is scheduled to begin in the first quarter of FY94 and end in the third quarter of FY94. Preparation of the Phase I RI/RFI report and the FS/CMS are scheduled to begin in the fourth quarter of FY94.

3.4.9 Operable Unit 9 - Original Process Waste Lines (ADS #1251)

In FY92, 20 IHSSs were transferred into OU 9 as a result of recent technical information and analysis. This activity involves characterizing a series of tanks and associated process waste lines totaling 21 IHSSs. The Original Process Waste Lines (OPWL) consisted of a system of 57 designated pipe sections extending between 73 tanks and 24 buildings connected by 35,000 feet of buried pipeline that transferred process wastes from the point of origin to onsite treatment plants. The system was placed into operation in 1952, and additions were made to the system through 1975. The original system was replaced over the 1973-1983 period by the new process waste system. Some tanks and lines from the original system have been incorporated into either the new process waste system or the fire water deluge collection system.

The original system is known to have transported or stored various aqueous process wastes containing low-level radioactive materials, nitrates, caustics, and acids. Small quantities of other liquids were also introduced into the system, including liquid wastes from foundry operations, medical decontamination fluids, miscellaneous laboratory liquids from Building 123, and laundry effluent from Buildings 730 and 778. The RI/RFI plan includes inspection and sampling of accessible OPWL tanks and pipelines and soil sampling to determine the extent of contamination in the zone of soils directly above the water table (vadose zone). Soil sampling will be performed by (1) excavating test pits and drilling boreholes where known or suspected releases occurred, near pipe joints and valves, and at approximately 200-foot intervals along the pipelines and (2) drilling boreholes around outdoor tanks. Soil characterization studies will determine the need for soil removal and/or treatment. Results of the RI/RFI will determine the need for interim and/or final remediation action.

The following activities were accomplished in FY92:

- Incorporated EPA/CDH comments on draft final RI/RFI work plan; delivered revised final work plan on February 28, 1992
- Initiated IHSS 121 soil sampling outside the Protected Area (PA)
- Initiated tank inspection/sampling outside PA

RI/RFI drilling activities outside the PA will continue during the first quarter of FY93. Fieldwork and laboratory work will consist of tank inspection, sampling, drilling, sample analysis, and data validation.

Fieldwork and laboratory work, including activities inside the PA, will continue into the first quarter of FY94. The draft Phase I RI/RFI report will be submitted in FY94, and the final Phase I RI/RFI report will be submitted during the first quarter of FY95. The draft Phase II RI/RFI work plan will be submitted during the fourth quarter of FY95.

Preparation of the Phase II RI/RFI report is scheduled to begin during the second quarter of FY94. The OU 9 IRA/ICM treatability study activities are scheduled to begin during the fourth quarter of FY94 and are scheduled to be completed during the third quarter of FY95.

3.4.10 Operable Unit 10 - Other Outside Closures (ADS #1231)

OU 10 consists of various hazardous waste units in 15 IHSSs located throughout the plant. Six of the IHSSs are located in the PA, two are located in the buffer zone near the Present Landfill, and seven are located near various buildings throughout the plant. Contamination at these sites resulted from pondcrete/saltcrete storage, drum storage, and waste spills.

The following activities were accomplished in FY92:

- Submitted draft Phase I RI/RFI work plan on November 27, 1991
- Submitted final Phase I RI/RFI work plan on May 1, 1992

Preparation of the Phase I RI/RFI report will begin in the third quarter of FY95 and continue into the third quarter of FY96. IRA/ICM treatability study activities will begin in the second quarter of FY96 and continue through the fourth quarter of FY96. An IRA/ICM is scheduled to be constructed in early 1998.

3.4.11 Operable Unit 11 - West Spray Field (ADS #1261)

The West Spray Field is located within the Rocky Flats buffer zone immediately west of the plant security area. The West Spray Field was in operation from April 1982 to October 1985. During operation, excess liquids from Solar Evaporation Ponds 207-B North and Center (contaminated groundwater in the vicinity of the ponds and treated sanitary sewage effluent) were pumped periodically to the West Spray Field for spray application. The spray field covers an area of approximately 105.1 acres, 38.3 of which received direct application of hazardous waste. The RI/RFI process will entail field studies to determine the presence and levels of hazardous constituents in soil and groundwater.

The following activities were accomplished in FY92:

- Submitted final Phase I RI/RFI work plan on January 2, 1992
- Addressed agency comments on final work plan
- Obtained agency approval of final RI/RFI work plan

The following activities are planned for FY93:

- Begin RI/RFI fieldwork
- Begin RI/RFI laboratory work and data validation

Phase I RI/RFI fieldwork is scheduled to be completed by the second quarter of FY94. RI/RFI laboratory work and data validation for the Phase I field investigation are scheduled to be completed in the third quarter of FY95. RI/RFI report activities and the IRA/ICM treatability study will begin in FY94 and will continue into FY95.

3.4.12 Operable Unit 12 - 400/800 Area (ADS #1007)

A total of 11 IHSSs are included in the 400/800 Area. These IHSSs include three cooling tower ponds, two solvent spill areas, two fiberglassing areas, two acid leak/spill areas, one process waste leak, and a radioactive spill site. The RI/RFI process will investigate possible contamination by organics, metals, radionuclides, and acids at these sites.

The following activities were accomplished in FY92:

- Scoped Phase I RI/RFI, EE, and HHRA work plans with EPA/CDH and Natural Resource Trustees
- Submitted draft Phase I RI/RFI work plan on May 8, 1992

The Phase I RI/RFI work plan will be approved in the first quarter of FY93.

RI/RFI fieldwork and laboratory work will begin in the first quarter of FY94. Fiberglassing Area (Building 664) investigations will begin in the first quarter of FY94. Phase I RI/RFI report activities will begin in the fourth quarter of FY94 and will be completed by the fourth quarter of FY95.

3.4.13 Operable Unit 13 - 100 Area (ADS #1008)

Cleanup of the 100 Area involves assessment and remediation of 14 IHSSs. These IHSSs are varied in nature and include chemical storage/spill areas, burn/destruction sites, drum burial areas, and radioactive sites.

The following activities were accomplished in FY92:

- Submitted final Phase I RI/RFI, EE, and HHRA work plans for EPA/CDH review
- Resolved EPA/CDH comments on final Phase I RI/RFI, EE, and HHRA work plans

Regulatory agency comments on the final Phase I RI/RFI, EE, and HHRA work plans will be incorporated in the first quarter of FY93. Phase I RI fieldwork/laboratory work, the EE, and the HHRA will commence during the first quarter of FY94 and continue into FY95.

3.4.14 Operable Unit 14 - Radioactive Sites (ADS #1010)

Work at the Radioactive Sites involves assessment and remediation of eight IHSSs. These IHSSs include three sites in the 800 Area, two sites in the 700 Area, and areas in the parking lots of Buildings 334, 444, and 664.

The following activities were accomplished in FY92:

- Submitted draft Phase I RI/RFI, EE, and HHRA work plans for EPA/CDH review on June 26, 1992
- Incorporated EPA/CDH comments to Phase I RI/RFI, EE, and HHRA work plans

The final Phase I RI/RFI work plan will be submitted in the first quarter of FY93.

All Phase I RI/RFI fieldwork/laboratory work will commence in the first quarter of FY94 and will be completed by the fourth quarter of FY95. Phase I RI/RFI report activities will begin in the third quarter of FY95 and will be completed by the third quarter of FY96. FS activities will begin in FY95.

3.4.15 Operable Unit 15 - Inside Building Closures

Work at OU 15 involves remediation of seven IHSSs: Building 881 Drum Storage Area; Building 865 Drum Storage Area; Building 883 Drum Storage Area; Original Uranium Chip Roaster; Unit 26, Building 881 Drum Storage; Unit 63, Building 371 Drum Storage; and Unit 32, Building 881, Cyanide Bench-Scale Treatment. Several drum storage areas and the uranium chip roaster must undergo RCRA closure as interim status units. Drums and dumpsters containing solids and liquids were stored at these facilities. Waste types include oils, coolants and solvents containing chlorinated hydrocarbons (RCRA F001 and F002 wastes), waste paints, and waste metals contaminated with solvents. Hazardous and radioactive constituents include chlorinated solvents, beryllium, and uranium. Closure plans for the facilities were submitted to CDH in 1988 and again in 1989. The major activity proposed is characterization and decontamination, if applicable, of concrete floors at the indoor facilities.

The following activities were accomplished in FY92:

- Submitted draft Phase I RI/RFI, HHRA, and EE work plans for EPA/CDH review on May 27, 1992
- Resolved EPA/CDH comments on Phase I RI/RFI, HHRA, and EE work plans

The final Phase I RI/RFI work plan will be submitted on October 26, 1992.

RI/RFI fieldwork and laboratory work will begin in the first quarter of FY94 for all IHSSs in OU 15. Closure plans will be finalized, and comments will be incorporated for review by CDH in the second quarter of FY94. The public comment responsiveness summary will be completed in the third quarter of FY94. Closure of the selected IHSSs will begin in the fourth quarter of FY94.

3.4.16 Operable Unit 16 - Low-Priority Sites (ADS #1009)

This assessment activity consisted of preparing a No Further Action Justification Document for seven IHSSs, including: Solvent Spill, Antifreeze Discharge, two Steam Condensate Leaks, Nickel Carbonyl Disposal, Water Treatment Plant Backwash Pond, and Scrap Metal Sites. A draft of this document was submitted on March 2, 1992, and the final will be issued after resolution of EPA/CDH comments.

3.4.17 Sitewide Activities (ADS #1012)

Sitewide activities include development of various plans, procedures, and studies that are IAG requirements and impact various environmental restoration tasks but are not included in any single OU. Many of the sitewide programs provide data for OU-specific RI/RFI and FS/CMS activities. Sitewide background studies, treatability studies, and risk assessments provide initial and supplemental data for OU activities. Sitewide activities will also be influenced by the Natural Resource Damage Assessment (NRDA) and the Agency for Toxic Substances and Disease Registry (ATSDR). Plans prepared under this ADS are available through public information repositories.

The sitewide groundwater monitoring program is designed to assess the quality and quantity of groundwater beneath Rocky Flats and to satisfy both federal and state regulations for groundwater at hazardous waste sites. This involves quarterly sampling and analysis of 390 wells located both upgradient and downgradient of Rocky Flats. Analytical parameters include both organic and inorganic constituents, metals, and radiochemistry. Water quality parameters (temperature, pH, alkalinity, turbidity, specific conductance, and dissolved oxygen) are also measured. In addition to chemical analysis, wells are measured and tested to provide data for hydrologic and modeling studies that will yield specific information regarding the nature and extent of chemical and radioactive contaminants within groundwater at Rocky Flats. The Groundwater Protection and Monitoring Program Plan outlines specific requirements for groundwater monitoring at Rocky Flats. The plan is updated annually.

Background characterization of surface water, groundwater, and soils is being conducted along with assessment of contamination at the OUs. The Background Hydrogeochemical Characterization and Monitoring Plan was submitted to EPA/CDH in January 1989, and implementation of the plan began in September 1989. The background characterization report was completed in the first quarter of FY91. Sampling and analysis will continue in subsequent years, and the background report will be updated annually. This document is designed to provide input to the RI/RFI and FS/CMS processes for individual OUs.

Sitewide geologic characterization is designed to assess the geology and hydrology of the entire plant site and create an integrated geologic and hydrogeologic model. This would incorporate data acquired during OU activities as well as sitewide data. Subsurface data will be correlated on a plantwide basis. Well and borehole logs will be correlated and interpreted. Cross-sections and subsurface maps will be generated along with some 3-dimensional models using a variety of methods, including computer generation. Structural data will be acquired and will be integrated with existing geologic and geophysical data for interpretation. Programs are ongoing for obtaining and interpreting subsurface data such as lithologic and stratigraphic data, hydraulic conductivity data, structural data, grain size and permeability data, and interpretations of gravity and magnetics data. In addition, a new groundwater recharge evaluation will be initiated. All information will be integrated and used in OU and sitewide investigations at Rocky Flats.

The Historical Release Report, which provides a complete listing of all spills and releases of hazardous substances occurring since the inception of Rocky Flats, was started in FY91 and completed in FY92. The Historical Release Report contains a comprehensive listing of all known contamination and is used to support the individual OU/IHSS identification. This information will be used by EPA/CDH to determine whether any additional sites need incorporation into OUs.

The final health and safety plan, which documents specific health and safety procedures, has been submitted for EPA/CDH review. The procedures outlined in this plan are required to ensure the health and safety of the investigative team and others (including the general public) during RI/RFI and FS/CMS processes, treatability studies, and implementation of the corrective/remedial actions for each OU. Training on these procedures will take place prior to any RI/RFI fieldwork.

The final Plan for Prevention of Contaminant Dispersion (PPCD) was completed in July 1991. This plan details activities that will be implemented to minimize the potential for windblown dispersion of waste dusts or other harmful materials from any site capable of releasing potentially hazardous windblown materials. A public review was conducted in FY91, and a responsiveness summary was subsequently issued.

The sitewide treatability study plan was finalized in June 1991. This plan identifies technologies that are likely to have broad application across Rocky Flats and establishes procedures for actual tests to be performed to better determine the applicability of those technologies. After sitewide treatability studies are conducted, a treatability study report will be prepared to provide data that may be substituted for OU-specific treatability studies. For some OUs, however, it will be necessary to perform OU-specific treatability studies to support the FS.

Rocky Flats was required to develop a work plan for implementing radionuclide discharge limits for water discharged via spray irrigation or stream drainages. The work plan requires (1) sampling A-, B-, and C-series ponds for radionuclides prior to discharge and (2) treatment of the water if specified contaminant levels are exceeded.

Sitewide NEPA documentation activities were initiated in the second quarter of FY91. Scoping and implementation plan activities for the Sitewide Environmental Impact Statement (SWEIS) were completed in FY91, and work has begun on the SWEIS. The SWEIS process, which will continue in FY93, involves an assessment of potential sitewide environmental impacts resulting from all environmental restoration activities.

Operations Management support services are also funded through this ADS and include tracking and reporting of all environmental field activities. Operations Management will provide IHSS support for Rocky Flats services along with the design, revision, and approval of standard procedures for environmental field operations.

An additional activity funded through this ADS is the examination of potential consolidation of IHSSs located in the PA. The PA contains all or portions of 10 OUs scheduled for the RI/RFI process. It may be advantageous to defer the RI/RFI process within the PA until such time that security concerns are no longer a factor. The resulting benefits would include (1) a reduction in operating costs attributed to the ease of operating in a less restrictive working environment and (2) better coordination of investigative and remedial effort resulting from the consolidation of geographically similar OUs.

In FY92, a preliminary project plan was prepared to provide direction for assembly of an IRA/ICM program for the PA. This preliminary project plan is currently undergoing regulatory agency review. The IRA/ICM plan would identify contaminant sources, potential migration pathways, and potential sensitive receptors for known PA contamination. It would also propose alternatives to reduce immediate risks to human health or the environment and define ARARs for the IRA/ICM project.

The following sitewide activities were accomplished in FY92:

- Completed final Historical Release Report on May 29, 1992
- Submitted final Discharge Limits for Radionuclides Work Plan and responsiveness summary to EPA and CDH
- Submitted PPCD responsiveness summary on November 25, 1991
- Completed treatability study EA, annual treatability studies report, and work plans for three treatability studies
- Completed design for two new decontamination pads, a GAC treatment system for removal of organics from decontamination wastewater, and a waste handling/storage facility for waste generated from environmental restoration activities

The following activities are planned for FY93:

- Prepare annual background characterization, investigation, and monitoring reports
- Prepare annual report for control of radionuclide levels
- Perform sitewide treatability studies, and prepare annual and interim treatability study reports
- Begin construction of decontamination facilities to support OU remediation activities

Additional activities to comply with NRDA and ATSDR will be initiated as necessary in FY93.

3.4.18 Program Management Support - Environmental Restoration (ADS #1233)

The activities funded under this ADS are undertaken primarily to fulfill objectives of the IAG or long-term planning needs. These activities include development of a community relations plan and a sitewide sampling/analysis plan (SAP), maintenance of administrative records, and preparation of annual upgrades to the FYP, SSP, and Roadmap.

The IAG and CERCLA require development of a community relations plan describing the mechanism used to address community concerns and foster community involvement. The community relations plan presents information regarding community relations activities, public repositories, mailing lists and newsletters, news releases, public meetings, public notification, records availability, public comment opportunities, public hearing opportunities, and technical assistance grants. The final community relations plan was submitted to the regulatory agencies in January 1991. The community relations plan Responsiveness Summary, a document that provides a catalog of all comments received during the public comment period as well as actions taken in response to comments, was submitted in June 1991.

The sitewide SAP is also a requirement of the IAG and serves as the basis for the initial individual OU SAPs. Each OU SAP will be modified to fulfill the unique requirements of the OU. The sitewide SAP consists of two parts: (1) a QAPjP that describes the policy, organization, functional activities, and quality assurance protocols necessary to achieve the data quality objectives dictated by the intended use of the data for each OU and (2) SOPs that detail the field techniques to be used during the site investigation and provide guidance to ensure that work is performed in accordance with EPA-approved methods. Training as set forth in these plans and procedures will occur prior to commencement of any RI/RFI fieldwork. Implementation of the QAPjP and SOPs will continue through FY93.

The Administrative Record is a collection of all documents pertaining to CERCLA- and RCRA-guided environmental remediation activities at Rocky Flats. The Administrative Record serves as a legal repository and historical compilation of important project documents. Maintenance of the Administrative Record will continue in FY93.

3.4.19 Decontamination Facilities (ADS #1271)

Operation and maintenance of decontamination facilities will include sampling of decontamination water and procurement and maintenance of decontamination equipment. These facilities are required in order to prevent cross-contamination of sampling sites and to prevent the spread of contamination to uncontaminated areas. Operation and maintenance of a GAC unit to treat decontamination water is also included in this ADS.

The following activities were accomplished in FY92:

- Completed upgrades to Decontamination Facility #1 at the 903 Pad

- Completed design and construction of new Decontamination Facility #2 inside the PA and Decontamination Facility #3 on the west side of the plant
- Completed design and construction of GAC treatment unit to pretreat decontamination water being pumped to the Building 374 evaporator for water treatment

The following activities are planned for FY93:

- Continue GAC treatment operations to pretreat wastewater produced by decontamination operations
- Continue operation and maintenance of decontamination facilities

3.4.20 Onsite/Offsite Water Management (ADS #1264)

This ADS covers onsite water management projects (Option J) intended to improve pond dam safety and operations, upgrade effluent treatment capabilities, improve site drainages, and implement recycling and zero-discharge of site waters. This activity will also support offsite water management projects (Option B) associated with Great Western Reservoir and Standley Lake, which will further reduce the potential for water-borne contaminants from Rocky Flats to affect local drinking water supplies.

Prior to the final selection of Options B and J, numerous potential alternatives were formulated for long-term management of surface waters generated on and passing through Rocky Flats. These alternatives were identified by DOE and the Cities' Working Group, which was formed at the request of Congressman David Skaggs (2nd U.S. Congressional District) and is commonly referred to as the Skaggs Committee. The Committee included representatives from local cities, Jefferson County, DOE, CDH, EG&G, EPA, and the offices of the Governor, U.S. Senator Timothy Wirth, and former U.S. Senator William Armstrong.

The Committee selected an alternative (referred to as "Option B Plus J" or "Option B with Selected Onsite Improvements") for long-term management and disposal of surface water. The major components of the option include (1) onsite improvements to reduce the volume of surface water discharged from Rocky Flats, (2) offsite improvements to Standley Lake, and (3) purchase of an equivalent water supply for the City of Broomfield as a replacement for Great Western Reservoir. Onsite activities include (1) construction of a new 100-year storm storage reservoir on Woman Creek, (2) extension of the pond C-2 interceptor ditch, (3) upgrade of the Kinnear Ditch, and (4) implementation of various water treatment, recycling, and improvement projects for surface water management. In FY92, Option B Plus J activities were funded by DOE-DP. Additional surface water management information is presented in Sections 4.2.1.3, 4.2.1.4, and 4.2.1.5.

The following activities were accomplished in FY92:

- DOE grant paid to Broomfield and Westminster
- Completed Surface Water Management Plan
- Finalized hydrologic mass balance
- Finalized site drainage plan

- Conducted FS for pond spray irrigation

The following activities are planned for FY93 (onsite activities are listed first, followed by offsite activities):

Onsite Water Management:

- Install permanent facilities for removal of low-level radiological contaminants from effluent waters as required prior to discharge
- Implement pond C-2 water recycling
- Complete spray irrigation FS, and perform spray irrigation design and construction at pond A-3
- Perform general site drainage improvements
- Improve drainages inside the PA
- Perform hydrologic modeling
- Implement dam inlet/outlet upgrades
- Install permanent electric power to pond A-4
- Perform site mapping

Offsite Water Management:

- Perform conceptual design and engineering for a new offsite reservoir pond to provide a 100-year flood storage reservoir on Woman Creek
- Install a Woman Creek diversion ditch around Standley Lake
- Design and engineer a pumping plant and pipeline connecting Woman Creek to Great Western Reservoir
- Install piping for a portion of the Kinnear Ditch
- Extend the existing pond C-2 interceptor ditch
- Purchase water rights to replace Great Western Reservoir supply
- Design and engineer a new water treatment plant for Broomfield
- Design and engineer a pipeline from Carter Lake to Broomfield
- Perform NEPA review of these projects as required

Onsite/offsite water management will be funded under the Environmental Restoration Program in FY93. The onsite projects will continue through FY97. Support for offsite projects will be completed in FY96.

3.4.21 Decontamination and Decommissioning Activities

Another responsibility of the environmental restoration program is the eventual decontamination and decommissioning (D&D) of every building at the site. These D&D activities will become increasingly important in future years as transition plans mature and are finalized. It is anticipated that these activities will be funded through separate ADSs specific to D&D activities in FY94 and beyond. Initial planning is already underway and is focused on the integration of D&D activities into existing plant projects and program development. Technical and administrative details for D&D, approaches, methods, procedures, and programs must be developed to enable efficient D&D of the site. Major FY93 activities include development of D&D ADSs and continuation of initial planning efforts.

4.0 DEFENSE PROGRAMS FUNDED (BASE) ENVIRONMENTAL PROGRAMS

Base environmental programs at Rocky Flats provide the ongoing environmental monitoring, modeling, and management oversight necessary to maintain plantwide compliance with applicable laws, regulations, and agreements. A primary objective of environmental management at Rocky Flats is to minimize and, where practicable, eliminate discharge of radioactive and nonradioactive hazardous effluents. Progress toward this goal is routinely measured by the air, soil, groundwater, and surface water monitoring programs. In the following sections, these programs, the environmental reporting system, and the plantwide chemical control system, all of which are currently funded by base environmental programs, are discussed. These activities will continue to be funded by DOE-DP until the site is transitioned to DOE-EM's jurisdiction. At that point, DOE-EM will fund these "landlord" activities.

4.1 AIR PROGRAMS

Air programs at Rocky Flats have been established to monitor the quality of air onsite, near the site, and in surrounding communities. These programs include monitoring of effluent and ambient air as well as various other activities such as meteorological monitoring, air modeling, environmental reporting, and Clean Air Act compliance assessment and permitting.

4.1.1 Air Monitoring Activities

Air monitoring programs have been designed to quantify potential impacts of Rocky Flats' operations on the public and the environment. The various air monitoring activities being performed at Rocky Flats are discussed below.

Prepare Air Pollution Emission Notices (ADS #5108)

Colorado Air Quality Regulation No. 3 requires submittal of an Air Pollution Emission Notice (APEN) for any criteria-pollutant emission source that could emit 1 ton/year (uncontrolled emissions) or sources emitting 1 pound/day or 0.175 ton/year of hazardous, toxic, or odorous pollutants. This requirement applies to processes as well as exhaust vents. In FY91, Rocky Flats submitted 104 initial APENs. This activity was funded under ADS #108 as a corrective activity. Rocky Flats will continue to update and revise these APENs as needed during the transition, decontamination, and decommissioning phases. The annual updates and maintenance of APENs and the submittal of renewal fees is funded by DOE-DP.

Continuous Emissions Monitoring (ADS #5003)

Following submittal of initial APENs by Rocky Flats in FY91, CDH is evaluating the air emissions sources for compliance with permitting requirements. Rocky Flats may be required to procure and install continuous emissions monitoring (CEM) equipment designed to collect nonradiological gaseous emissions data. Rocky Flats' exhaust systems would then be evaluated, and instrumentation technology applicable to these systems would be reviewed

to determine whether existing buildings and exhaust systems must be modified before the CEM equipment can be installed.

Buildings that must resume operations to support the emerging plant mission and that emit the highest levels of nonradiological pollutants are likely to be permitted first by CDH if air toxics regulations are promulgated. Based on the requirements and the priorities of the permits, CEM equipment may be installed. If the CEM system is installed and tested, an initial set of data would be collected and submitted to CDH for approval. After CDH approval, operation, calibration, data analysis, and quality assurance, as required by the permits, would be initiated as ongoing activities.

Effluent Air Monitoring (Radioactive and Nonradioactive) (ADS #5007)

NESHAPs requirements establish emissions standards for substances designated as hazardous air pollutants. The hazardous air pollutants of concern at Rocky Flats include asbestos, beryllium, and radionuclides. Asbestos abatement projects are monitored continually, and regular inspections of asbestos disposal sites are conducted. Air monitoring for radionuclides is routinely conducted, including effluent monitoring for tritium in Buildings 776/777 and 707. Other routine monitoring for NESHAPs compliance is also funded under this ADS. Occasional sampling of volatile organic compounds (VOCs) may also be performed at the request of CDH, as provided in the Colorado Air Quality Control Act. Routine monitoring, maintenance, and analysis will continue during FY93.

Administrative Compliance Order Activities

NESHAPs also established specific stack monitoring requirements for airborne radionuclides. Rocky Flats was pursuing activities funded under corrective activities to address deficiencies in the existing monitoring network (see Section 2.2.1). The scope of activities was augmented and the implementation schedule was accelerated by the ACO issued by EPA on March 3, 1992. The following major projects are required by the ACO:

- Detailed inspection of 63 process air ducts
- An effluent study of each vent
- A study of effluent particle size and composition
- An isokinetic sampling study for Building 569

In FY92, stack upgrades studies and determination of velocity profiling locations were completed under ADS #83. The upgrades planned for FY93 include replacement of flow rate totalizers, relocation of sampling sites, and addition of filter holders in addition to the studies required by the ACO.

Nonradiological Ambient Air Monitoring (ADS #5008)

Rocky Flats conducts limited monitoring of ambient air to evaluate the nonradioactive parameters of suspended particulates. These pollutants are monitored near the east entrance (Gate 10) using methods approved by EPA. The National Ambient Air Quality Standards (NAAQS) for particulates (promulgated on July 1, 1987) changed the monitoring

of nonradiological particulates in ambient air from the measurement of total suspended particulates to the measurement of particulates that are 10 microns (one millionth of 1 meter) in diameter or less (PM10 method). This method provides a more accurate measurement of the potentially harmful effects of particulates because particulates less than 10 microns in diameter cannot be filtered out of the respiratory system by the mucous membranes. CDH has requested that state industrial sources continue sampling for total suspended particulates as well as initiate PM10 sampling until such time that CDH incorporates federal PM10 requirements into state regulations. Samplers for total suspended particulates and PM10 samplers at Rocky Flats are collocated to maintain continuity of historical nonradioactive ambient data collected at the site. Routine monitoring, maintenance, and analysis will continue during FY93.

Radioactive Ambient Air Monitoring (ADS #5017)

Radioactive ambient air samplers monitor airborne radioactive materials in and around Rocky Flats. Data obtained from existing samplers are used to quantify the radioactive dose to the community as a result of Rocky Flats operations. The samplers operate continuously, and the filters are collected periodically for analysis of plutonium. A full network analysis of americium-241 and uranium was implemented in FY92. Increased emphasis will be placed on this system as site remedial activities progress.

The Radioactive Ambient Air Monitoring Program (RAAMP) involves installing and operating air sampling equipment that meets PM10 requirements (described above) to monitor ambient air onsite, along the site perimeter, and in surrounding communities. Verification of the siting study and testing and validation of the prototype RAAMP sampler continued in FY92. Procurement and installation of new samplers are planned for FY93.

Air Program Upgrades (ADS #5016)

This task includes projects and programs that support air quality monitoring efforts or those that require special study before implementation as routine programs. Some of the activities covered by this task are being performed in response to the Governor's Rocky Flats Scientific Panel on Monitoring Systems recommendations, National Oversight Panel (Ahearne and Conway Committees) recommendations, and Rocky Flats Environmental Monitoring Council recommendations. Other activities funded under this ADS also meet objectives outlined in the AIP. Air program upgrade activities are discussed below.

The community radiation (COMRAD) monitoring station at the Standley Lake Library site has been operational since December 1991. By December 1992, four additional COMRAD stations will be constructed in communities in the vicinity of Rocky Flats. A program manager and station managers will be assigned to the COMRAD program. NEPA review for the community air monitoring stations will continue in FY93.

Upgrades to the Radioiodine Monitoring (Criticality) Network were not funded in FY92 and may never be implemented because of the termination of plutonium production operations. A siting study to determine the quantity and locations of new ambient air samplers was completed in FY92. RAAMP prototype sampler testing will be completed in October 1992.

4.1.2 Air Programs Support Activities

Air Programs support includes activities necessary to maintain compliance with air-related regulatory requirements and to enhance the monitoring being performed and the use of the resulting data.

Meteorological Monitoring (ADS #5005)

DOE Draft Order 5400.3 and DOE's Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance require that each DOE facility establish a meteorological monitoring program. Monitoring equipment must be situated at locations and heights that will provide a characterization of the atmospheric conditions into which emissions may be released and transported. Federal regulations mandate the use of representative meteorological data from the AIRDOS-EPA computer model for modeling airborne emissions from Rocky Flats. The activities supported by this ADS are required to enhance and upgrade meteorological monitoring capabilities to assist in emergency preparedness planning and operations at Rocky Flats. Meteorological equipment and professional services are needed to meet these requirements.

Meteorological data are currently collected on a continuous basis from a 61-meter tower located west of Rocky Flats. A 10-meter tower, collocated with the 61-meter tower, has been installed and is operational. Calibration, audits, and minor maintenance of the two towers will continue as needed in FY93.

The meteorological monitoring network will be upgraded in order to adequately characterize plant conditions. A new network of meteorological stations is being installed across the plant site. The network will provide data to characterize meteorological conditions unique to the site's terrain. Wind velocity measurements needed for emergency response and the emergency preparedness plan will be the primary emphasis of the network.

A meteorological work station will provide data required for forecasting services for emergency preparedness, emergency response, and general Rocky Flats functions. The work station will also provide continuous monitoring of meteorological stations to reduce equipment down-time and maintenance delays and to respond to meteorological upset conditions. The forecasting work station equipment is being procured and is expected to be operational in FY93.

Air Modeling (ADS #5011)

Air modeling is conducted at Rocky Flats to provide assessment of air monitoring programs and to assist in monitor siting studies. A design-based wind study to predict the contaminant plume migration for a worst-case event scenario has been completed. A monitor siting study to determine the "point of maximum impact" for the location of RAAMP samplers has been completed. Ongoing FY93 activities include validation of historical contaminant data, use of the AIRDOS-EPA model, and routine modeling for NEPA activities, environmental

restoration, and plant operations. Procurement and evaluation of various computerized modeling programs, including other approved EPA and CDH models and various unapproved models, will continue in FY93.

Clean Air Act Implementation/Compliance (ADS #5014)

Rocky Flats is developing technical information and performing field verifications that will be used to demonstrate compliance with air emissions standards. Work under this task includes health physics evaluations of ambient air monitoring data to determine the health impacts of plant operations, research of sampling and analytical techniques and procedures, quality assurance performance audits, high-efficiency particulate air (HEPA) filter and dust resuspension studies, and trend analysis of surveillance data.

Procedural changes to the Rocky Flats effluent sampling program continued in FY92. Health physics evaluations will continue in FY93 and beyond.

Under the Clean Air Act, EPA regulations, and/or CDH requirements, various processes at Rocky Flats require air emissions permits. The air permitting process involves preparing and applying for routine air permits, acquiring CDH/EPA approvals for sampling methodology, performing field compliance audits, obtaining NESHAPs permits, and preparing and maintaining air quality permits based on CDH's review and evaluation of the site's APENs. An evaluation of VOC source control technologies and a VOC dispersion modeling study were completed in FY92. Permitting activities will continue in FY93 and beyond.

Air Emissions Monitoring (ADS #5075)

This activity includes the determination and implementation of reasonably achievable control technology for VOC sources at Rocky Flats. An air emissions inventory, including actual and potential emissions, is compiled in order to verify Rocky Flats' compliance with CDH Air Pollution Control Division regulations.

4.2 WATER MANAGEMENT PROGRAM

The water management program at Rocky Flats includes activities that address surface water and groundwater management. These activities are discussed below.

4.2.1 Surface Water Management

Rocky Flats has developed an aggressive surface water management strategy to prevent the possibility of unplanned offsite releases via its surface waters. These activities are of particular interest to the public because two major water supplies, Great Western Reservoir and Standley Lake, are located directly downstream of Rocky Flats. In the past, Rocky Flats had discharged treated water into these reservoirs, which serve various communities in the Denver metropolitan area. The public concern expressed over water issues has resulted in a complex network of regulations, agreements, and procedures for water quality treatment and management at Rocky Flats. The regulatory requirements relating to surface water,

Rocky Flats surface water operations, the Surface Water Management Plan (SWMP), surface water management studies, and surface water monitoring are discussed below.

4.2.1.1 Regulatory Requirements Related to Surface Water

Four sets of regulatory requirements affect surface water management at Rocky Flats: (1) primary laws that require treatment and monitoring of surface water; (2) secondary laws, regulations, and orders that implement primary laws; (3) agreements between DOE and regulatory agencies; and (4) other laws (collateral laws) that indirectly regulate surface water.

The primary laws that govern surface water management at the site are the Atomic Energy Act, the Department of Energy Organization Act, and the Federal Water Pollution Control Act (Clean Water Act). These acts are implemented through regulations, orders, and requirements for field operations and contractors.

Secondary regulatory requirements that pertain to surface water management are DOE orders and federal and state laws and regulations. DOE orders establish environmental programs to ensure that DOE operations comply with laws and standards to protect the public from exposure to radiation. A Presidential Order requires DOE to comply with the Clean Water Act and the Atomic Energy Act. The Colorado Water Quality Control Commission has also promulgated specific surface water and groundwater standards for Rocky Flats and waters immediately downstream.

Three agreements affect the management of surface water at Rocky Flats: (1) the AIP between DOE and CDH, (2) the NPDES FFCA between DOE and EPA, and (3) the IAG between DOE, EPA, and the State of Colorado. These agreements require that water discharges are in compliance with the Clean Water Act and site-specific state water quality stream standards.

Collateral laws relevant to Rocky Flats water management operators include CERCLA, RCRA, NEPA, the Anti-Deficiency Act, the Clean Air Act, the Colorado Radiation Control Act, and Colorado water rights laws. These various laws govern Rocky Flats' actions in cases of contamination cleanup, hazardous substance management, environmental impact evaluations, spending authorization, air quality projection, radioactive materials management, and water appropriation and use.

4.2.1.2 Surface Water Operations

Up to 1.5 million gallons per day of treated raw water are delivered to Rocky Flats by the Denver Water Board. This water is treated onsite and used for drinking, showers, laundry, cooling towers, industrial processes, and as fire water supply.

All wastewater from processing activities is treated through a special system for process wastewater, which is isolated from and independent of other treatment systems at the plant. This treated water is then reused for industrial processes and does not currently discharge

offsite. Therefore, process wastewater is not addressed by surface water management or other base environmental programs. It is instead addressed in Section 5.3.5, Liquid Waste Operations.

All sanitary wastewater is treated at the Sewage Treatment Plant (STP), which is located in the South Walnut Creek basin. The STP includes an activated sludge plant and tertiary clarification and filtration facilities. Effluent from this facility is discharged to pond B-3 in the South Walnut Creek basin (see Figure 14).

Surface water on the Rocky Flats site consists of normal flow in streams and ditches, storm water runoff, treated sanitary STP effluent, and groundwater return flow. Surface water on plant site is managed primarily through three series of detention ponds: the A-series ponds along North Walnut Creek, the B-series ponds along South Walnut Creek, and the C-series ponds along Woman Creek. The combined storage capacity of these ponds is approximately 330 acre-feet.

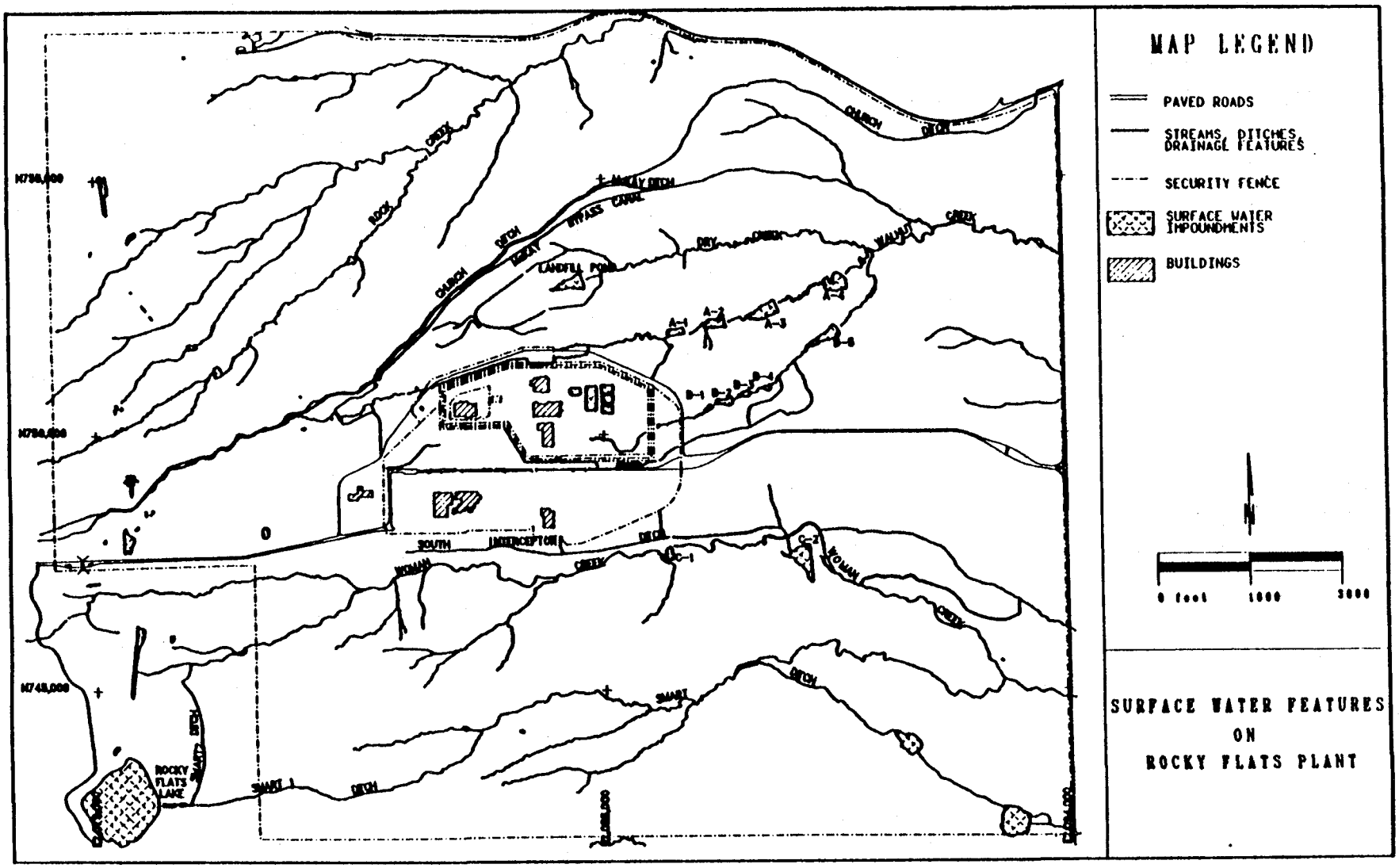
The ponds serve three main purposes for surface water management: (1) spill control, (2) surface water control for monitoring and possible treatment, and (3) storm water detention. For these purposes, the ponds were designed to retain no more than 10 percent of their maximum volumes for prolonged periods. This ensures adequate contingency capacity for spill and flood control. Excess water in terminal pond B-5 is piped to pond A-4 for storage. When pond A-4 reaches approximately 50 percent of its total capacity and discharge is needed, discharge is conducted in a controlled manner only after execution of numerous activities involving downstream cities, CDH, and Rocky Flats. These activities include pre-discharge water quality evaluation to ensure regulatory compliance, water treatment if necessary, re-evaluation of the water quality (if required), and written concurrence from CDH regarding the safety of water to be to discharged (ADS #5112).

To provide additional safety features, the City of Broomfield has used DOE funding to construct the Broomfield Diversion Ditch around Great Western Reservoir. The ditch is located downstream of pond A-4 and east of Indiana Street and is used by Broomfield to intercept pond A-4 discharges and route them to Walnut Creek below the reservoir. Discharges from pond C-2 are also currently routed via pipeline to the ditch.

A contingency/emergency release procedure has been developed for the ponds, specifying measures and procedures to be taken at Rocky Flats in the event of a severe flood or prolonged fill levels that present a significant chance of dam failure. In addition, other activities are under way to improve surface water operations, including dam reinforcement and water quality characterization and assurance, which are discussed below.

Dam Reinforcement at Ponds (ADS #5120)

In the past, terminal pond levels have been managed to remain at 0 to 10 percent of pond capacity, with water detention quantities exceeding 10 percent of pond capacity for only short periods of time. Surplus water was then discharged to Walnut Creek and Woman Creek. Allegations stemming from the 1989 FBI investigation and concerns related to



Surface Water Features on Rocky Flats

Figure 14

potential water contamination led to adoption of stringent stream standards by the Colorado Water Quality Control Commission (CWQCC) in March 1990. Implementation of these standards through the AIP, which calls for an evaluation of the safety of water discharged from Rocky Flats, resulted in longer water detention times (to allow for more extensive sampling, analysis, assessment, and treatment as required) and water volumes significantly higher than the long-term design capacities for the ponds.

Although capable of containing a 100-year flood event, the existing earthen dams were designed as short-term, low-volume water detention structures. If large volumes of water are stored in the ponds for extended periods of time, the dams could eventually become saturated and weaken. Because of the possibility that these dams will be used to retain higher volumes of water for longer periods of time than the original design would support, a geotechnical evaluation of dams A-4, B-5 and C-2 is in progress. NEPA documentation and design of dam reinforcements for ponds A-4, B-5, and C-2 will take place after recommendations by the Corps of Engineers are evaluated. In addition, annual dam safety inspections are performed by the Corps, with recommendations identified in the inspection reports.

Water Quality Characterization and Assurance (ADS #5121)

New CWQCC standards are in effect for water releases from the terminal ponds, and treatment may be required to ensure that discharges of water continually meet these standards. However, effective treatment requires knowledge of water quality variables and their impacts on treatment processes. The activities funded under this ADS provide for characterization of water contaminant levels and evaluation of the physicochemical nature of Rocky Flats' surface waters. Optimization of technologies for treatment of the identified compounds, with the goal of enhancing performance against water quality standards is also funded under this ADS.

Water samples are provided to Los Alamos National Laboratory for constituent characterization. Assessment of the pond water quality is scheduled for completion at the end of FY93.

4.2.1.3 Surface Water Management Plan

Rocky Flats has developed the Rocky Flats Surface Water Management Plan (ADS #3287) to integrate water quality management activities and to address regulatory requirements and public concerns in an effective, unified manner.

The SWMP has four distinct objectives:

1. To create an organizational framework that will facilitate water quality planning with involvement from local cities, the public, and regulators

2. To outline surface water treatment, operations, and management at Rocky Flats

3. To provide a complete description of current and planned surface water management activities at the plant, including the long-range selected management option

4. To ensure that surface water management is conducted in compliance with all pertinent laws and regulations

Activities included in the SWMP are described below and in Sections 4.2.1.4 and 4.2.1.5.

Numerous potential alternatives have been formulated for long-term management of surface waters generated on and crossing through Rocky Flats. These alternatives were identified by DOE and the Cities' Working Group, which was formed at the request of Congressman David Skaggs (Colorado 2nd U.S. Congressional District) and is commonly referred to as the Skaggs Committee. The Committee included representatives from local cities, Jefferson County, DOE, CDH, EG&G, EPA, and the offices of the Governor, U.S. Senator Timothy Wirth, and former U.S. Senator William Armstrong.

The Committee selected an alternative (referred to as "Option B Plus J" or "Option B with Selected Onsite Improvements") for long-term management and disposal of surface water. The major components included in the option are (1) onsite improvements to reduce the volume of surface water discharged from Rocky Flats, (2) offsite improvements to Standley Lake, and (3) purchase of an equivalent water supply for the City of Broomfield as a replacement for Great Western Reservoir. Offsite activities include a replacement water supply for Broomfield and construction of a bypass diversion around Standley Lake. Onsite activities include construction of a new 100-year storm storage reservoir on Woman Creek, pond C-2 interceptor ditch extension, Kinnear Ditch upgrade, and various water treatment, recycling, and improvement projects for surface water management.

The scope and design of the components of the selected alternative will be further developed through continued negotiations involving Broomfield, Westminster, DOE, regulatory agencies, and other pertinent parties.

In addition to the components of the above option, Rocky Flats will proceed with other important onsite projects, including drainage system improvements, monitoring programs, and other pond improvements.

The following activities were accomplished in FY92:

- Submitted Draft SWMP, received comments, and finalized SWMP
- Submitted Draft Master Drainage Plan

In FY93, implementation activities for the Surface Water Management Plan will be funded by DOE-EM under ADS #1264 (see Section 3.4.20). In FY93 and beyond, other activities such as permanent piping for pond C-2 recycle, structural upgrades to dams, onsite drainage improvements, Standley Lake and Great Western Reservoir construction projects, and construction of additional storage capacity on Walnut Creek will be funded by this ADS.

4.2.1.4 Surface Water Management Studies

Three types of studies relating to surface water management are under way or planned at Rocky Flats: (1) hydrologic studies, (2) water quality studies, and (3) waste treatment studies. These studies are being conducted to yield a better understanding of water quality and hydrology at the site, which will contribute to improved treatment and management of surface water.

Hydrologic studies include studies relating to site drainage improvements, evaluation of the feasibility of achieving zero discharge from the plant site, development of a site water balance model, evaluation and upgrading of onsite dams, development of hydrologic pond models, and an assessment of long-term water management scenarios for the plant site.

Water quality studies include those related to cleanup activities required under the IAG, a source control study to identify potential sources of onsite contaminants, surface water contaminant modeling, detailed radionuclide studies to better understand the characteristics of radionuclides in surface waters at the plant site, and a storm water quality study for the NPDES permit application for storm water.

Waste treatment studies that are planned include a study of the feasibility of reusing Sewage Treatment Plant effluent at the plant site, studies to identify potential future treatment methods for surface water, and a wastewater minimization program plan. The objective of these studies is to reduce the amount and sources of contaminants in surface waters at the plant site.

4.2.1.5 Surface Water Monitoring Programs

Extensive water quality monitoring programs have been initiated at Rocky Flats, including monitoring of surface water, groundwater, and public water supplies of surrounding communities. Water monitoring and control enhancements are being implemented to support these monitoring programs.

Surface Water Monitoring and Program Upgrades (ADS #5019)

These activities include routine collection and analysis of onsite and offsite surface water samples in support of various Rocky Flats program requirements such as the IAG and the NPDES permit. Also covered are efforts to upgrade and enhance the effectiveness and technical/analytical capabilities of the five surface water and sediment monitoring programs. Approximately 10 sediment stations are sampled on a quarterly basis to collect data for background and selected IHSS characterization.

The sitewide surface water monitoring program includes quarterly sampling of approximately 22 sites to monitor VOCs, radiological parameters, total metals, and inorganics. The program provides monitoring for selected IHSSs and for background characterization. The NPDES FFCA program includes sampling required by the NPDES permit and the NPDES FFCA, routine sampling of detention ponds, split sampling with CDH, and sampling for

operational controls. Sampling of local offsite waters for community monitoring and background characterization is performed under the offsite monitoring program.

An event-based program is in place to monitor the potential for radioactive and hazardous chemicals to be transported offsite in runoff from storms and pond discharges. The event-based program involves measuring flow and suspended sediments and evaluating water chemistry at 13 stations in the buffer zone during storm runoff and pond discharge events.

Lakes and streams in Colorado that are not influenced by Rocky Flats are sampled in the offsite sampling program to provide a baseline water quality assessment for Rocky Flats and to provide technical justification for Rocky Flats' positions in water quality standards hearings and permit negotiations. Routine sampling, data analysis, and reporting will continue to provide baseline water quality data.

Community Water Monitoring

Community water monitoring includes sampling and analysis of public water supplies and tap water from several surrounding communities. In the past, Great Western Reservoir, one of the water supply sources for the City of Broomfield, and Standley Lake, a water supply for the cities of Westminster, Thornton, Federal Heights, and Northglenn, received runoff from Rocky Flats drainage systems. Currently, no discharge from terminal ponds A-4, B-5, or C-2 enters either Great Western Reservoir or Standley Lake. Discharged water is routed via the Broomfield Diversion Ditch around Great Western Reservoir and back into Walnut Creek downstream of Great Western Reservoir.

In addition to receiving past water runoff, Standley Lake and Great Western Reservoir may have received radionuclide contaminants from airborne sources as a result of various environmental events at Rocky Flats. These contaminants, as well as resuspended dust from plant site, may have been washed into these two water supplies. (Contamination in these and other offsite areas is being investigated under OU 3 - Offsite Releases; see Section 3.4.3.) In the past, weekly grab samples were collected from Standley Lake and Great Western Reservoir, composited into a monthly sample, and analyzed for plutonium, uranium, and americium concentrations. Tritium and nitrate analyses were conducted on weekly samples. In May 1992, sampling of all community locations was reduced. Grab samples from Standley Lake and Great Western Reservoir are now collected and analyzed for plutonium, uranium, americium, tritium, and nitrates.

Sampling of drinking water from Boulder, Broomfield, and Westminster has been similarly reduced. Samples are collected monthly and analyzed for plutonium, uranium, americium, and tritium. Tap water samples are collected on a quarterly basis from the communities of Arvada, Denver, Golden, Lafayette, Louisville, and Thornton. These samples are analyzed for plutonium, uranium, americium, and tritium.

Water Monitoring and Control Enhancements (ADS #5004)

This activity is required under the Clean Water Act and the Rocky Flats NPDES permit, as supplemented by the AIP, the Colorado Water Quality Control Act, and NPDES FFCA.

This activity includes (1) designing, installing, and maintaining a real-time remote monitoring/measurement/data acquisition and computer data processing system for key surface water locations, including holding ponds and offsite discharge points; (2) ensuring environmental protection by controlling, containing, sampling, and analyzing incidental waters originating from Rocky Flats; (3) providing analytical laboratory interface and tracking and facilitating receipt of timely and accurate information to meet reporting requirements; (4) monitoring, assessing, and documenting the quality and safety of Rocky Flats surface waters; and (5) correlating biological monitoring and toxicity testing results with water and contaminant chemistry.

The following activities were accomplished in FY92:

- Installed remote monitoring equipment on Walnut Creek and Indiana Street
- Installed flow measuring device at pond C-1, and installed additional piezometers at terminal dams to measure dam integrity
- Installed new flow meter on Woman Creek, downstream of pond C-2, and installed automatic sampler and flow meter on Smart Ditch (at Indiana Street)
- Installed additional remote sensing and monitoring equipment
- Utilized biological toxicity tests to characterize Rocky Flats surface waters
- Conducted research to determine reasons for different rates of algal growth in select Rocky Flats ponds
- Conducted ongoing biomonitoring of surface water biota
- Conducted studies of contaminant pathways
- Tracked and evaluated pond and surface water data
- Completed technical engineering reviews of various DOE-EM monitoring and instrumentation projects, including establishment of various baseline equipment specifications and telemetry requirements for surface water and groundwater projects
- Established working group to develop and complete a surface water instrumentation system to provide automated flow and water quality monitoring at Rocky Flats holding ponds

- Completed modifications and upgrade of several remote flow stations, including pond C-1 flow meter and data storage of flow measurements at second flow station

The following activities are planned for FY93:

- Design, establish, and maintain real-time remote monitoring/measurement and data acquisition and computer data processing system for key surface water locations, including holding ponds and offsite discharge points; establish computer-based data files using real-time telemetry data summaries
- Establish calibration data base for instrumentation maintenance for surface water monitoring system
- Use applied biology to monitor, assess, and document emergency (spill) incidents and offsite water discharges
- Continue biomonitoring and toxicity testing to monitor and characterize Rocky Flats surface waters and correlate these results with water and contaminant chemistry

Sewage Treatment Plant Upgrades Oversight (ADS #5288)

The STP is being upgraded in accordance with the Rocky Flats NPDES FFCA (see Section 5.4.4). This ADS provides for support and oversight for the planning, design, and construction of these STP upgrades to ensure compliance with the NPDES permit and the NPDES FFCA.

Environmental Surveillance and Engineering (ADS #5015)

All engineering packages for projects at Rocky Flats are evaluated to verify that surface water considerations are met. This ADS also includes surveillance of ponds, dams, creeks, and the buffer zone for potential water level impacts on the ponds as well as emergency spill response and incidental water sampling and analysis.

NPDES FFCA Management (ADS #5063)

This ADS provides for ongoing regulatory oversight, project management, and technical support to help meet the NPDES FFCA commitments, including a Building Drain Study, Chromic Acid Incident Plan and Implementation Schedule, sludge drying bed upgrades, Vadose Zone Monitoring Plan, and STP Compliance Plan.

Clean Water Act Implementation and Compliance (ADS #5122)

This ongoing program includes activities necessary to ensure compliance with regulations, public commitments, permits, and agreements involving Rocky Flats surface waters. These activities include participation in negotiations and regulatory proceedings, legal research, sampling and analysis of water, compilation of data for reporting purposes, completion of forms and letters, and support during inspections and audits related to compliance issues. Full participation in the regulatory process is critical to proper management of surface water and compliance with water discharge laws.

4.2.2 Groundwater Management

Groundwater management activities include groundwater monitoring programs and the well abandonment and replacement program.

Groundwater Monitoring (ADS #5023)

The sitewide groundwater monitoring program is designed to assess the quality and movement of groundwater at Rocky Flats and to ensure compliance with state and federal regulations for groundwater at hazardous waste sties. The program currently involves well development, sampling, and chemical analysis of groundwater from 400 wells within the Rocky Flats complex. OU and sitewide monitoring wells are also sampled under this program.

Analytical parameters include organic and inorganic constituents, metals, and radiochemistry. Water quality field parameters (temperature, specific conductance, pH,

alkalinity, turbidity, and dissolved oxygen) are also measured. In addition to chemical analysis, water levels are measured monthly at 250 wells and quarterly at all wells in the network. Other ongoing assessment programs for determination of groundwater quality and flow characteristics include stable isotope studies, tracer tests, aquifer tests, flow modeling, and a real-time well monitoring network.

These activities all support the groundwater and geochemical modeling and risk assessment activities performed to yield specific information on the impact of chemical and radioactive contaminants on groundwater quality at Rocky Flats. Quarterly well status reports, quarterly and annual RCRA groundwater monitoring reports, tracking reports, and a comprehensive well classification and appraisal report for the entire well network will be generated in FY93. The Groundwater Protection and Monitoring Program Plan, which outlines specific requirements for groundwater monitoring at Rocky Flats, has been finalized and will be revised in FY93.

Well Abandonment and Replacement Program

Rocky Flats has initiated a Well Abandonment and Replacement Program (WARP) to ensure that groundwater monitoring wells and piezometers at Rocky Flats provide accurate and defensible data for the Rocky Flats Ground Water Monitoring Program (GWMP).

The WARP has been developed to meet the following specific goals:

- Identify wells and piezometers at Rocky Flats that fail to meet criteria for viability and/or usefulness to the GWMP
- Abandon these wells and piezometers according to procedures that prevent groundwater contamination
- Install replacement wells and piezometers at locations as needed

Approximately 50 groundwater monitoring wells are scheduled for abandonment, and approximately 10 replacement wells are scheduled for installation during FY93.

4.3 SOIL MONITORING

A number of soil monitoring activities (ADS #5002) are taking place at Rocky Flats to address issues associated with potentially contaminated soils at or near the site. Soil sampling has been conducted annually since 1972 at 1- and 2-mile radii from the plant center. This is done to examine possible dispersal patterns and potential long-term contamination trends. Historically, only plutonium data have been collected and analyzed, but an effort is under way to sample and analyze for all radionuclides. Assessment will include a comparison with background radionuclide levels. Historical data have been routinely reported in the Annual Site Environmental Report, which is available at the DOE information repositories (see appendix D).

Ongoing soil assessment and soil monitoring projects include (1) comparison and evaluation of existing soil sampling methods to improve or develop new methodologies, (2) determination of plutonium to americium ratios sampling,(3) completion of a historical

plutonium concentration map, (4) development of current isoconcentration maps of all radionuclides present in or near the plant site, (5) investigation of potential contaminant transport from surface soils to the unsaturated and saturated zones, (6) radiological characterization of sites prior to site-specific activities, (7) assessments to support special projects, and (8) surface soils characterization in support of emergency activities.

4.4 ENVIRONMENTAL REPORTING

In order to comply with regulatory requirements, various environmental reports are issued on a regular basis under ADS #5013. Environmental surveillance and regulatory compliance data are evaluated and reported in the Annual Site Environmental Report. The 1991 Annual Site Environmental Report was prepared and reviewed in FY92.

Other regulatory reports include the Air Quality Management Plan, the Environmental Information System/Onsite Discharge Information System Summary, the Environmental Monitoring Plan, and the Environmental Protection Implementation Plan. These reports are further discussed below. In addition, monthly data reports are generated for information exchange meetings with CDH. Data are also prepared for special presentations to Rocky Flats management as well as for public information. Management plans for groundwater, surface water, and air quality are revised on an annual basis.

The Rocky Flats Plant Annual Site Environmental Report provides information to the public regarding the impact of Rocky Flats on the environment and public health. The report presents a compliance summary, a description of environmental monitoring programs, a summary of environmental data, and radiation dose estimates for surrounding communities for a one-year period.

The Air Quality Management Plan (AQMP) addresses and integrates activities, regulatory requirements, self-improvement projects, and oversight review committee concerns pertaining to air quality management. The AQMP describes requirements of DOE orders, EPA and CDH regulations, agreements among the agencies, and recommendations and suggestions from internal and external review groups.

The Effluent Information System/Onsite Discharge Information System (EIS/ODIS) is a computer-based management information system for radiological effluents. Rocky Flats provides air and water data to the system on an annual basis.

The Environmental Monitoring Plan, which is reviewed annually, presents the rationale and design criteria for the Environmental Monitoring Program at Rocky Flats. Driven by DOE Order 5400.1, the plan includes a regulatory analysis and addresses specific monitoring programs and studies being conducted at Rocky Flats as well as quality assurance requirements and program implementation procedures.

The Environmental Protection Implementation Plan (EPIP) is an annual report that identifies Rocky Flats requirements for compliance with DOE Order 5400.1 - General Environmental Protection Program. The EPIP addresses (1) the identification of environmental standards and notification and reporting requirements and (2) development

of environmental protection program plans and environmental monitoring plans. The EPIP describes current compliance with DOE Order 5400.1 as well as the planned and ongoing efforts to achieve full plant compliance.

ADS #5013 also funds assistance for the Dose Reconstruction and Toxicological Review program, which was initiated in January 1991 and will be completed in December 1994. This study, which is being conducted by CDH, will determine the levels of and potential uptake pathways for hazardous substances (both radioactive and chemical) that could have been or may be released from the plant boundaries. These data will be used to develop a quantitative health risk assessment for Rocky Flats and the surrounding area. The toxicological review will provide a basic level of knowledge regarding the variety of hazardous substances used at Rocky Flats and to which surrounding residents may have been exposed.

The following activities were accomplished in FY92:

- Completed and distributed FY91 Annual Site Environmental Report
- Completed draft EPIP in January 1992
- Completed monthly environmental monitoring reports on schedule
- Completed quarterly compliance reports
- Completed EIS/ODIS Report in April 1992
- Provided coordination for Dose Reconstruction and Toxicological Review project
- Completed summary report for compliance with continuous release reporting requirements for EPA in February 1992
- Revised Air Quality Management Plan
- Completed draft FY92 Annual Site Environmental Report

The following activities are planned for FY93:

- Finalize and submit FY92 Annual Site Environmental Report
- Submit Environmental Monitoring Plan and EPIP
- Issue monthly monitoring reports
- Issue quarterly compliance reports
- Continue coordination role for the Dose Reconstruction and Toxicological Review project
- Issue EIS/ODIS Report
- Update and revise Air Quality Management Plan

4.5 CHEMICAL CONTROL SYSTEM

The Chemical Control System (ADS #5237) is a comprehensive electronic system for managing storage and use of hazardous materials at Rocky Flats. Implementation of this system will ensure the site's compliance with state and federal regulations pertaining to hazardous materials. The four principal functions that will be accomplished by the Chemical Control System are as follows:

1. The system will produce electronic Material Safety Data Sheets (MSDSs) using a standard format and standard terminology, which will be accessible plantwide via the Rocky Flats Local Area Network.

2. A real-time chemical inventory will be maintained, allowing on-line updates, bar-code labeling, application of warning labels, inventory reporting, and processing of physical inventories.

3. A real-time chemical tracking system to track hazardous chemicals from purchase requisition to final offsite disposal will be made available.

4. The system will provide reports, including inventory reports, chemical usage reports, and reports required by SARA Title III, Section 312 (Tier II), and SARA Title III, Section 313, Form R.

The following activities were accomplished in FY92:

- Completed full implementation and verification of the Chemical Control System at Rocky Flats, including incorporation of Chemical Control System requirements into Environmental and Quality training materials for standard 40-hour courses
- Purchased and installed (plantwide) VAX terminals and Intermec bar-code scanning equipment
- Completed Chemical Control System orientation and presented instructional briefings to thousands of plant personnel
- Designated Chemical Tracking Specialists to buildings in which chemicals are stored and used
- Developed Chemical Control System self-assessment checklist to fulfill performance measurement requirements
- Designed and presented formalized Chemical Control System software demonstration program

The following activities are planned for FY93:

- Develop customized screen menus to augment search and query capabilities of the Chemical Control System
- Formalize use of Chemical Control System as a primary planning and performance tool for all decontamination and decommissioning activities at Rocky Flats buildings
- Incorporate waste minimization program objectives into the Chemical Control System software and administrative procedures
- Enhance Chemical Control System software functions to automate compliance support functions for the RCRA Part B Permit, RCRA closures, standard Hazard Communication and Chemical Process Safety, SARA Title III, emergency preparedness, air and water permitting, Final Safety Analysis Reports, and worker risk communication
- Maintain the Chemical Control System at Rocky Flats through a formalized assessment program managed by the Chemical Tracking and Control Systems group
- Incorporate ability to enter MSDS information directly into the Chemical Control System as part of ongoing data entry efforts of Chemical Tracking and Control Systems group
- Formalize implementation of chemical procurement review function performed by Chemical Tracking and Control Systems group

5.0 WASTE AND RESIDUE MANAGEMENT

5.1 OVERVIEW

This section presents a discussion of Waste Management activities at Rocky Flats. Waste Management activities are categorized according to their function: (1) regulatory compliance and project administration (referred to as program management support), (2) waste minimization, (3) waste treatment, (4) waste storage, and (5) waste disposal.

Within each category of Waste Management activity, various wastes are handled according to waste type. Residues and the seven waste types generated at Rocky Flats are categorized according to their level of radioactivity and the presence/absence of RCRA-regulated hazardous constituents. Applicable permitting, treatment, storage, and disposal requirements are determined according to these waste types.

Waste Types

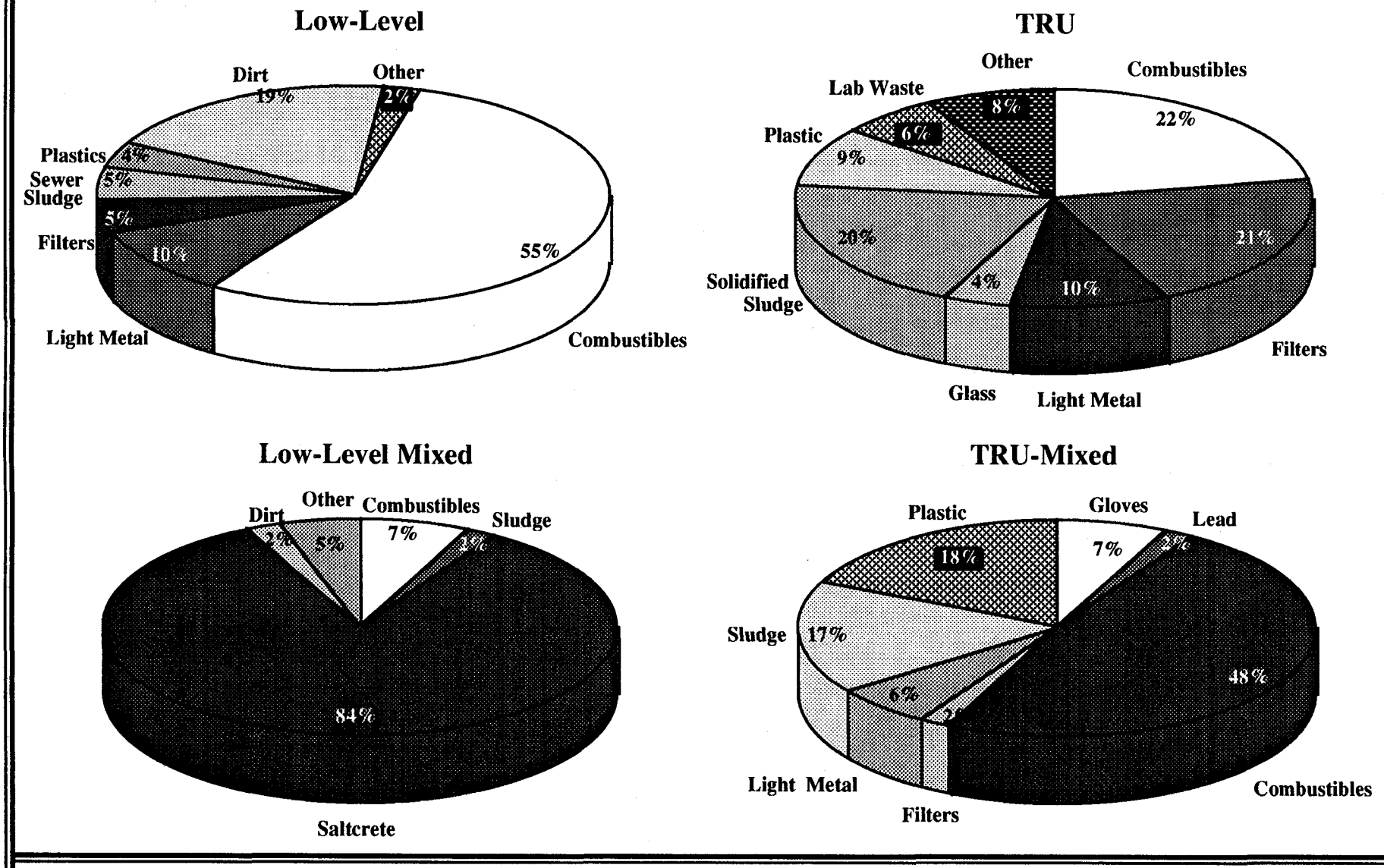
Seven major categories of waste are generated at the site: transuranic (TRU) waste, TRU-mixed waste, low-level waste, low-level mixed waste, hazardous waste, Toxic Substances Control Act (TSCA)-regulated waste, and sanitary waste. Residues are also generated at the site. These waste categories and residues are briefly defined below.

TRU waste is waste contaminated with alpha-emitting transuranic radionuclides (atomic number greater than 92) with half-lives greater than 20 years and in concentrations greater than or equal to 100 nanocuries (nCi) per gram (g). At Rocky Flats, TRU waste is primarily contaminated with plutonium and americium. This waste is usually categorized as contact-handled waste because the package surface dose rate is no greater than 200 millirem (mrem) per hour, no additional shielding of the waste is required, and the waste can be handled directly by personnel using standard protective equipment. Remote-handled waste has a surface dose rate greater than 200 mrem per hour; Rocky Flats does not generate remote-handled waste. A distribution of the components of 1991 TRU and TRU-mixed waste is shown in Figure 15.

TRU-mixed waste contains both transuranic and hazardous waste constituents. It must be managed in accordance with both appropriate radioactive waste regulations and hazardous waste regulations.

Low-level waste is radioactive waste that is not categorized as high-level radioactive waste, TRU waste, spent nuclear fuel, or uranium or thorium tailings. The concentration of transuranic radionuclides in low-level waste is less than 100 nCi/g. A distribution of the components of 1991 low-level and low-level mixed waste is shown in Figure 15.

Low-level mixed waste contains both radioactive and hazardous waste constituents. This type of waste must be managed in accordance with both appropriate radioactive waste regulations and hazardous waste regulations.



Rocky Flats Plant
1991 Generated Waste Distribution
Figure 15

Hazardous wastes are materials defined as hazardous because they are listed in state or federal regulations or exhibit hazardous characteristics as defined in state or federal regulations. Hazardous characteristics include reactivity, corrosivity, ignitability, and toxicity. In this document, the term "hazardous waste" refers to wastes that are not radioactively contaminated (see definitions for mixed wastes).

TSCA wastes are wastes that are regulated by specific provisions of the Toxic Substances Control Act as a result of high levels of public concern regarding their potential human health effects. At Rocky Flats, there are two TSCA-regulated wastes: asbestos and polychlorinated biphenyls (PCBs). Both radioactively contaminated and nonradioactive asbestos and PCB wastes are regulated under TSCA. Although TSCA-regulated wastes are managed as a subset of the hazardous waste program, the substantially different regulatory environment surrounding these wastes merits a separate discussion.

Residues are materials that contain amounts of actinides considered economically recoverable at the time of their generation. Some residues contain hazardous waste constituents (mixed residues) and are regulated under RCRA. Residues will require processing to meet transportation and disposal criteria. Residues are discussed separately in Section 5.7.

Sanitary wastes include general refuse and solid wastes that are not contaminated with either radioactive or hazardous material. Sanitary wastes are recycled or disposed in an onsite landfill.

5.2 PROGRAM MANAGEMENT SUPPORT

Activities included in this section represent the daily project/program operations involved in waste management and related projects. These activities provide support in the areas of program management, data management, compliance activities, technical and engineering operations, and funding to the State of Colorado and local communities to support environmental monitoring services and drinking water protection projects.

5.2.1 Program Direction (ADS #3031-1)

This activity provides DOE oversight and management of waste management functions to ensure compliance with DOE orders and federal and state laws and regulations. DOE personnel coordinate permitting and compliance activities and negotiate compliance agreements with state and federal regulatory agencies, direct DOE planning activities (Five-Year Plan, Roadmap, Site-Specific Plan), and monitor M&O contractor performance.

The following activities were accomplished in FY92:

- Provided technical support for the Waste Isolation Pilot Plant (WIPP) project, construction and testing of the TRUPACT-II Loader and Supercompactor and Repackaging Facility (SARF)
- Established the DOE-EM Quality Assurance Program
- Planned for transfer of residues from DOE-DP to DOE-EM

The following activities are planned for FY93:

- Direct phased transition of buildings from DOE-DP to DOE-EM
- Expand implementation of the DOE-EM Quality Assurance Program
- Oversee residue management
- Expand the waste minimization program
- Establish a DOE-EM operational readiness program
- Establish a self-assessment program
- Assess Rocky Flats facilities with respect to the emerging plant mission

5.2.2 Waste Programs Support Activities

Waste Programs support activities, carried out by the M&O contractor, provide (1) ongoing support necessary for compliance with applicable regulations and agreements; (2) planning, budgeting, and tracking; and (3) technical support to maintain safe ongoing operations. Most of these activities fall under ADS #3812, Program Integration, including Compliance Program Management, the Waste and Environmental Management System (WEMS), Waste Management Program Support, and Support for Compliance Activities. Waste stream characterization activities are funded by DOE-DP (ADS #5055, #5061, #5292).

5.2.2.1 Compliance Program Management

Permitting and compliance activities at Rocky Flats provide the framework necessary for waste generators to comply with applicable federal, state, and local waste laws, regulations, and DOE orders. Six programs are in place to accomplish the compliance program goals:

1. RCRA permitting, including development of RCRA permits and modifications

2. Waste surveillance, consisting of oversight of plant operations with regard to regulatory compliance

3. Waste guidance, which includes providing regulatory guidance on a plantwide basis to promote compliance with applicable regulations

4. Waste area engineering guidance, which includes providing waste guidance to waste generators on a daily basis

5. Spill response and reporting, which includes ensuring appropriate response to and reporting of spills

6. Special projects, including training of waste and operations personnel

The following activities were accomplished in FY92:

- Completed the following permit actions:
  - Centralized Waste Storage Building Permit Modification
  - TRU-Mixed Part B Permit Modification
  - Organic Air Emission Part B Supplement

  - Evaporator Permit Modification
  - Mixed Residue Permit Modification
- Performed 750 inspections
- Established a waste stream data base
- Developed Toxic Substances Control Act (TSCA) and Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) compliance procedures

The following activities are planned for FY93:

- Complete the following permit actions:
  - Building 374 Upgrades Permit Modification
  - Interim Status Units Permit Modification
  - Waste Cementation Permit Modification
  - Building 569 Addition Permit Modification
  - Permit modifications for FFCA II waste treatment technologies and other miscellaneous plant projects
- Begin implementation of Phase II Organic Air Emissions regulations

An additional focus of Compliance Program Management is bringing treatment and storage of mixed residues into regulatory compliance (see Section 5.7).

5.2.2.2 Waste and Environmental Data Management System

WEMS tracks all wastes generated at Rocky Flats from "cradle to grave" and is the official operating record for RCRA-controlled materials at the plant. Development of the system is being accomplished in four modules: waste inventory tracking and control, offsite shipping, generator, and liquid tracking. The waste inventory tracking and control module was completed prior to FY92.

The following activities were accomplished in FY92:

- Completed and implemented offsite shipping module
- Completed and implemented generator module
- Completed WEMS software QA program
- Completed WEMS operating procedure, programming, validation, and verification for the SARF

The following activities are planned for FY93:

- Develop liquid waste tracking module
- Ongoing maintenance, operation, and enhancement of system

Implementation of the liquid waste tracking module and integration of the entire system are planned for FY94.

5.2.2.3 Waste Management Program Support

Waste Management Program Support is responsible for providing planning, engineering, technical, and QA support for environmental and waste management operations, programs, and projects. The types of activities performed remain consistent from year to year.

The following activities were accomplished in FY92 and will continue in FY93:

- Procedure writing and review
- Maintaining a QA program for waste management activities
- Personnel training of individuals responsible for training waste operations personnel
- Developing a program for management of classified waste
- Providing engineering and technical support to waste management projects and programs
- Coordinating with Nevada Test Site regarding certification and disposal of low-level and low-level mixed waste
- Tracking and reporting waste management activities and commitments
- Information management (establishment of a purchase requisition tracking and control system)
- Providing scheduling, planning, and budgeting support to managers of waste management activities
- Developing planning documents, including the FYP, SSP, Roadmaps, and quarterly reviews
- Developing analytical laboratory methods and capability for waste characterization
- Participating in community relations efforts pertaining to waste management activities at Rocky Flats
- Performing in-house (EG&G) audits of waste management compliance requirements
- Developing and maintaining the low-level waste management program
- Maintaining waste storage inventories within limits

In FY94, many project-specific activities (e.g., Waste Engineering project management, NEPA documentation, safety analyses, and Operational Readiness Reviews) will be funded via the project rather than the program support task.

5.2.2.4 Program Support for Compliance Activities

Program Support for Compliance Activities provides for necessary personnel to manage waste programs in accordance with requirements provided by DOE orders and CDH and EPA agreements (e.g., AIP, FFCA II for LDR waste). In addition, this activity includes program management functions for all waste identification and characterization activities within the Waste Programs organization. Finally, this activity supports a large portion of a variety of treatment technology development activities.

The primary work in FY92 focused on compliance with requirements of FFCA II for Land Disposal Restricted (LDR) wastes (May 10, 1991). This agreement requires development

and implementation of mixed-waste treatment technologies that will enable Rocky Flats to reach compliance with the Land Disposal Restrictions defined under the Hazardous and Solid Waste Amendments (HSWA) to RCRA. The Comprehensive Treatment and Management Plan (CTMP) is required by the FFCA II for LDR waste and establishes the scope and schedule for development of LDR waste treatment technologies.

The following activities were accomplished in FY92:

- Submitted CTMP to EPA
- Submitted annual LDR progress report
- Submitted Waste Stream and Residue Identification and Characterization (WSRIC) reports
- Submitted waste minimization plan annual update
- Reduced hazardous waste backlog for disposal

The primary activities scheduled for FY93 will include revising program plans to accommodate additional tasks and complying with all requirements of the approved CTMP (see Section 6.2).

The annual LDR progress report and waste minimization plan annual update will be submitted in FY93.

Activities in FY94 and beyond will consist of complying with the CTMP schedules and milestones.

5.2.2.5 Waste Stream Characterization (Base Programs #5055, #5061, and #5292)

The WSRIC program was designed to meet current waste characterization needs at Rocky Flats to fulfill various agreements among DOE, EPA, and CDH.

The primary objective of the WSRIC Program is to provide accurate characterization of wastes and residues at Rocky Flats in sufficient detail to comply with all applicable regulations. This waste characterization activity includes development of individual books for each building on plant site, specifying the waste generated for every process in the building. Currently, all characterization is based on process knowledge; however, sampling and analysis has commenced and the analytical data will be incorporated as part of the characterization in the building books as soon as data validation is complete.

The building books are updated as necessary by building personnel to maintain accurate and complete characterization of the wastes produced. In addition, annual re-verification will be conducted on process knowledge characterizations.

To-date, 539 processes and 4,460 output streams have been characterized by process knowledge. A total of 316 waste streams outside the Protected Area (PA) and 17 waste streams inside the PA have undergone chemical analysis; data validation is in progress.

The following activities were accomplished in FY92:

- Chemical analysis of approximately 400 waste stream samples
- Preparation and submittal of the Phase II residue characterization plan to CDH
- Production and submittal of 165 building books to CDH
- Characterization of residue streams using process knowledge
- Development of sampling and analysis data bases
- Preparation of WEMS to receive the WSRIC data base
- Preparation of WSRIC quality assurance project plan
- Preparations of sampling and analysis plan for the Solution Stabilization Program for Building 771
- Data validation for chemical analyses

The following activities are planned for FY93:

- Perform chemical analysis on 600 waste streams
- Transfer WSRIC data base to WEMS
- Re-verify a minimum of 30 percent of the processes studied in FY90, FY91, and FY92
- Identify input streams for all liquid waste tanks and valve vaults at Rocky Flats
- Prepare building books for all remaining and new buildings at Rocky Flats

5.2.3 Payments

5.2.3.1 Payments to State (ADS #3814)

This ADS provides funding to the State of Colorado, as outlined in the AIP, to enable the state to perform environmental monitoring and oversight and to provide payments to communities identified in the AIP. The payments also cover fees assessed by the State because Rocky Flats is a RCRA treatment and storage facility. Funding will continue throughout the life of the AIP (through June 1994).

In FY92, payments were made in accordance with the Rocky Flats schedule. Beginning in FY93, additional funding will be paid to the state because all RCRA treatment, storage, and disposal facilities in Colorado will be assessed fees for stored reactive and radioactive mixed wastes.

This funding, which includes some one-time payments that began in FY90 and some State of Colorado annual payments, will continue throughout the life of the AIP (through June 1994). CDH has proposed to eliminate the existing cap on fees for reactive and radioactive mixed wastes, which will substantially increase the annual fees.

5.2.3.2 Payments to Local Communities (ADS #3815)

DOE has committed to funding a water management project to protect water supplies of the cities of Broomfield and Westminster, Colorado. This funding will (1) allow Westminster to construct water retention and diversion structures to prevent runoff from Rocky Flats from entering Standley Lake and (2) allow Broomfield to access new drinking

water supplies and discontinue use of Great Western Reservoir. Offsite water management activities are funded under ADS #1264 in FY93 and are summarized in Section 3.4.20.

5.3 MINIMIZATION

The Rocky Flats Waste Minimization Program was formally organized in 1988 and has aggressively pursued techniques to reduce the volume and toxicity of Rocky Flats waste streams. The program is conducted to support sound environmental practices, achieve cost reductions, and meet EPA, CDH, and DOE requirements for waste minimization. The program focuses on waste reduction at the source and environmentally sound recycling, recovery, and reuse of waste materials. As a result of the change in plant mission, announced in early 1992, the Waste Minimization Program is currently undergoing re-evaluation. Planned activities will be modified to support future decontamination and decommissioning projects.

Specific and measurable goals established by the Waste Minimization Program are as follows:

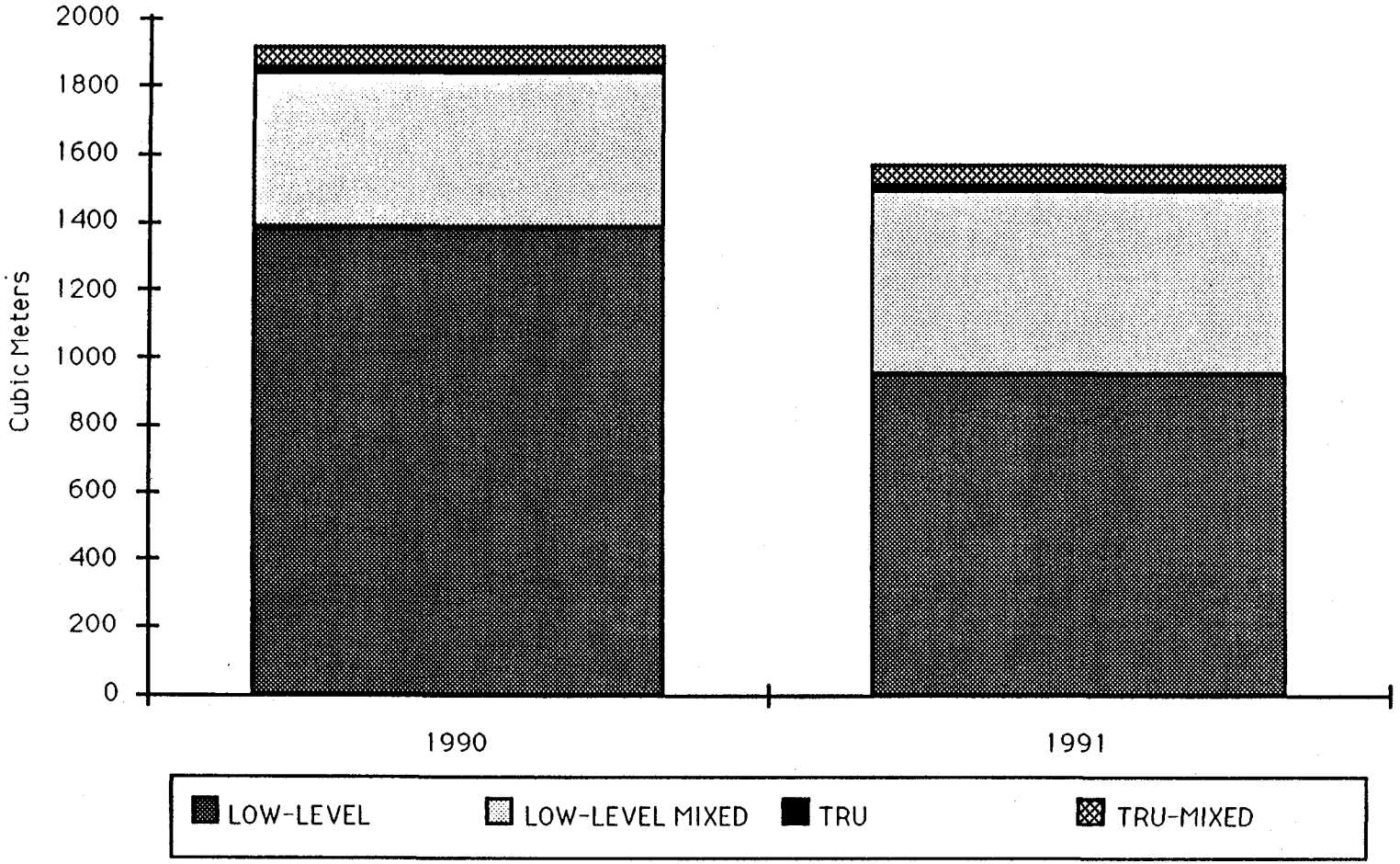
- Reduce the amount of solid waste generated by 10 percent per year "across the board"
- Increase by 10 percent per year the amount of office paper recycled
- Recycle a minimum of 10 tons of cardboard in calendar year 1992, and increase the actual amount recycled by 10 percent each year for subsequent calendar years

Goals for waste generation will be applied to each major waste type generated at Rocky Flats, with the exception of primary waste generated from large-scale decommissioning or environmental remediation projects (e.g., pondcrete). Waste from these projects will be reported separately. WEMS will serve as the information source for tracking waste generation rates and measuring progress against goals.

The Waste Minimization Program has been in effect for several years and has become a specific requirement of RCRA and the resulting FFCA II for LDR waste. Plantwide efforts over the past few years have been successful. Since the suspension of plutonium operations in 1989, non-plutonium production, plant utilities, maintenance, and other support units have remained active and continue to generate waste. Waste minimization efforts successfully reduced overall waste generation by 15 percent from 1990 to 1991. A waste generation comparison for 1990 and 1991 by waste type is shown in Figure 15.

Employee involvement is key to minimizing waste in specific work areas through process improvement and reduced use of hazardous materials. The direct experience and process knowledge held by those working in a specific area will make possible the achievement of Rocky Flats' waste minimization goals.

Future targeted reductions are numerous and include improved segregation of TRU waste from low-level waste to reduce the volume of TRU waste generated, material substitutions for hazardous substances, process changes, and equipment redesign. Projects identified to



Radioactive Waste Generation 1990 versus 1991
Figure 16

achieve future reductions are categorized under the seven ADSs discussed below. Future waste minimization program plans will incorporate the direction resulting from the emerging mission of Rocky Flats. The seven ADS programs, along with key projects, are summarized below. Waste Minimization Planning (ADS #3813) is funded by DOE-EM. The six waste minimization project activities are funded by DOE-DP.

5.3.1 Waste Minimization Planning (ADS #3813)

The Waste Minimization Planning task covers the administrative needs of the Waste Minimization Program and includes the following waste minimization related activities:

1. Program management
2. Feasibility studies and cost-benefit evaluations
3. Employee training and awareness
4. Waste minimization assessments
5. Waste Minimization Program performance measurement
6. Reporting on waste management/minimization issues

The following activities were accomplished in FY92:

- Completed study evaluating unit costs of waste operations
- Completed cost-benefit evaluation of carbon dioxide cleaning process
- Collected process waste data, and modeled production processes in six buildings
- Completed analysis of solid waste generation, and identified further opportunities for recycling
- Conducted waste minimization assessment of nonradioactive hazardous waste generation
- Updated waste minimization segment of waste generator training

The following activities were accomplished in FY92 and will continue in FY93:

- Management of 14 waste minimization projects
- Revision and re-issue of Waste Minimization Program Plan as required by the CDH RCRA Permit, FFCA II for LDR waste, and DOE Orders 5400.1 and 5820.2A
- Evaluation of employee suggestions for waste minimization
- Sponsorship of two employee awareness contests, and establishment of incentive awards program for waste minimization and pollution prevention
- Published the Rocky Flats Plant Annual Waste Reduction Report and quarterly waste generation reports

5.3.2 TRU/TRU-Mixed Waste and Residue (ADS #5030)

Several opportunities have been identified for minimization of TRU and TRU-mixed waste and residue materials. These projects are briefly described below.

Hydrocyclone Installation

Installation of hydrocyclones in process lines will significantly reduce the amount of particulates reaching the in-line Fulflo filters. The hydrocyclones will extend the life of the Fulflo filters and thereby reduce the volume of filter waste being generated; feasibility testing was completed in FY92, and the study results were submitted to the Residue Elimination Project (REP) for evaluation and possible inclusion in the REP design.

Development/Fabrication of New In-Line Filter

This project involved development and fabrication of a regenerable and longer lasting in-line liquid filter to replace the polypropylene-wound Fulflo filters currently in use. Testing of a Kevlar filter developed by a local vendor was completed in early FY92. The test was not successful, and the Kevlar filter is no longer a viable option. A different polypropylene filter was evaluated by the Waste Minimization and Materials Development groups in FY92 and was found to be more efficient than the Fulflo filter. Policy and procedural changes have been proposed, which will enable use of this new filter in FY93.

Decontamination and Decommissioning Technologies

Various technologies will be evaluated for use in decontamination and decommissioning work. One technology under study involves use of a carbon dioxide pellet blasting unit for decontamination of metal waste, which would convert the waste from TRU to low-level waste. This carbon dioxide pellet blasting unit is described below in Section 5.3.3.

5.3.3 Low-Level/Low-Level Mixed Waste (ADS #5031)

Low-level and low-level mixed wastes are frequently generated in cleaning processes at Rocky Flats. The projects described below are intended to reduce generation of those waste types.

Mobile Decontamination Unit

Use of a mobile decontamination unit that utilizes a hot water spray followed by vacuum pick-up for cleaning areas with radioactive contamination will eliminate the use of large quantities of wet paper towels and cloths. The decontamination equipment was refurbished in FY92 and will be used in FY93 for decontamination of uranium-contaminated areas.

Carbon Dioxide Pellet Blasting Unit

Installation of a carbon dioxide pellet blasting unit to strip and decontaminate metal material or equipment will reduce the use of solvents, improve operational efficiency, and increase the portion of material that can be recycled. A demonstration proving the effectiveness of the equipment was performed in FY91. In FY92, pilot-scale testing of two different units continued in order to determine which unit was more reliable, safer, easier to operate, and more effective. Purchase and use of full-scale equipment is planned for FY93.

Improved Segregation of Nonradioactive and Low-Level Wastes

In FY93, the Waste Minimization group will upgrade operating procedures to improve the segregation of nonradioactive and low-level wastes, thereby reducing the amount of waste that must be managed as low-level waste.

5.3.4 Hazardous Waste (ADS #5032)

The current focus of hazardous waste minimization efforts is conservation of hydraulic oil. The Plant Maintenance group and General Laboratories have developed an oil testing program designed to evaluate oil quality on a regular basis. Instead of performing frequent oil changes, oils are tested and changed only when characteristics such as viscosity, additive depletion, and clarity have fallen below established limits. A pilot program is currently in progress. If the program proves to be cost-effective and has no negative impact on equipment maintenance, it will be implemented plantwide.

Also in FY93, waste assessment activities will continue and additional hazardous waste minimization projects will be identified.

5.3.5 Process Wastewater (ADS #5033)

Large volumes of process wastewater are used at Rocky Flats and require subsequent treatment in the Building 374 evaporator. Treatment is costly (approximately $0.50 per gallon). The activities described below are in progress to recycle wastewater and reduce overall water usage.

Evaluation of Laundry Water Recycling

This project involves continued evaluation of laundry water recycling systems that would reduce the large volumes of laundry wastewater requiring treatment in Building 374. A recent study that evaluated the feasibility of recycling third-cycle laundry rinse water for use as first-cycle laundry wash water was completed in FY92. A larger project that would enable recycling of all laundry wash water was also evaluated in FY92. A proposal and funding request will be submitted in FY93.

Film Processing Wastewater Recycling

Installation of water treatment units for recycle of process wastewater from film processing operations in five buildings is in progress. Treatment and ion-exchange regeneration units have been purchased and are ready for installation. Most of the Building 460 installation was completed in FY91. Systems operations testing and start-up were completed in FY92. Full system implementation is expected by FY93.

Development of Computer Model for Treatment Process Optimization

This project involves development of a computer model to optimize the ion-exchange treatment processes in Building 771 and reduce the amount of wastewater generated by the

process. The model was completed in early FY92 and showed that wastewater produced by the ion-exchange systems could be reduced by 25 percent. The optimization model has been submitted to REP for evaluation and possible inclusion in the REP design.

5.3.6 Solid and Sanitary Waste (ADS #5034)

Nonhazardous and nonradioactive waste forms have also undergone assessment at Rocky Flats to determine methods to reduce their volumes and opportunities for recycling. Solid waste projects are focused on reduction of both sanitary wastewater and sanitary solid waste such as office trash, packing materials, and cafeteria waste. Current projects are described below.

Installation of Water-Saving Shower Heads

This project will result in a 60 percent reduction of water usage for showers. The project was completed in FY92.

Building 460 Wastewater Recycling

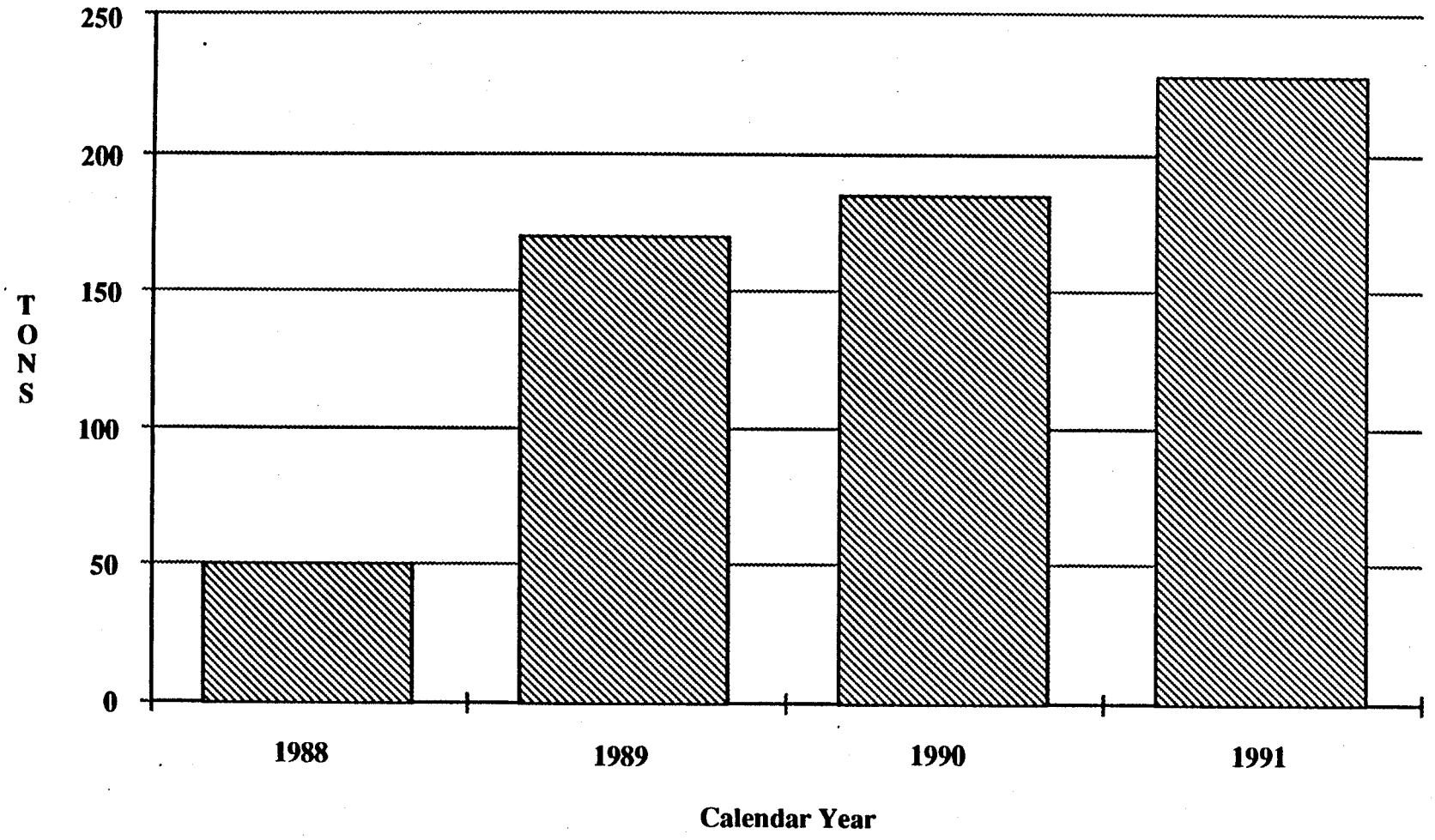
Recycling methods could be developed for production-related sanitary and process wastewater streams in Building 460 for reuse in the building. The proposed project will involve a total recycle and cleaning system capable of handling organics, trace metals, and acidic/basic solutions. The project will reduce overall plant water discharges by eliminating approximately 5 million gallons of sanitary wastewater per year and 1.4 million gallons of process wastewater per year. An Engineering Scope and Estimate was initiated in early FY92. The project will be submitted for funding upon completion of the Scope and Estimate.

Expansion of Paper Recycling Program to the Protected Area

A feasibility study was undertaken in FY91 to investigate the availability of commercial monitoring equipment to detect contamination in waste paper collected in the PA for recycling. No adequate instrumentation was identified. Documentation and administrative controls are being developed that would eliminate the potential for contamination in recycled paper. The time frame for development of this program has not yet been determined. A graph showing the amount of paper recycled in each of the past four calendar years is presented in Figure 17.

Reduction in Use of Disposable Dishes and Flatware in Cafeterias

This project involved installation of dishwashers in the cafeterias and purchase of dishes and flatware to reduce or eliminate the use of certain styrofoams and plastic disposable items. Conversion of four cafeterias was completed in FY92, eliminating approximately 60 percent of cafeteria waste. An additional dishwasher will be installed and dishes and flatware will be purchased to complete the conversion in FY93.



Rocky Flats Plant
Paper Recycling Program
Figure 17

Installation of Baler for Cardboard and Aluminum

Cardboard and aluminum collection areas will be located throughout the plant. Materials collected will be taken to a central area for baling and will then be sent offsite for commercial recycling. The equipment was purchased in FY92 and will be installed in FY93.

5.3.7 Halogenated Solvent Elimination (ADS #5035)

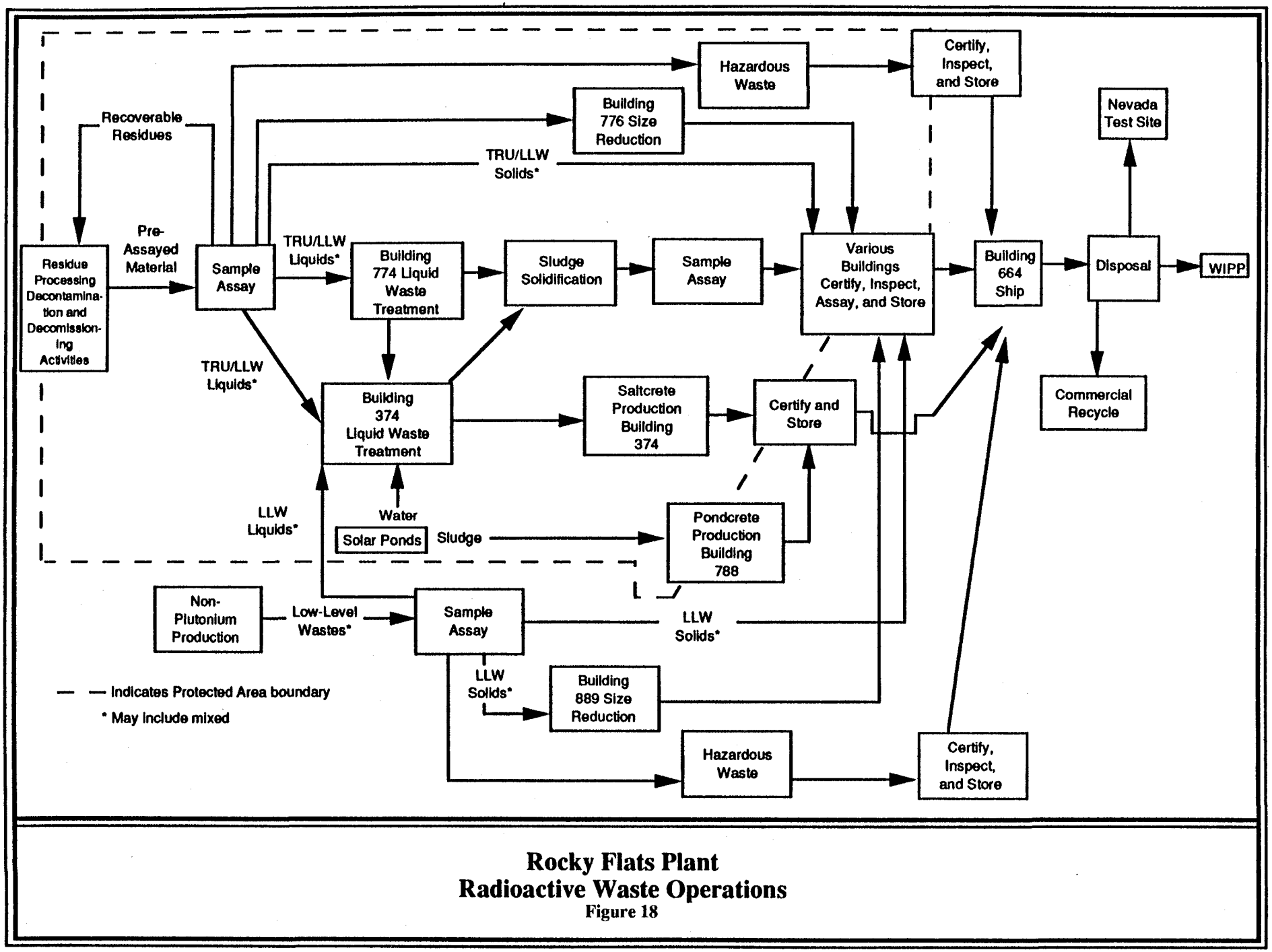
Halogenated solvents were used primarily for cleaning plutonium and weapons components throughout various stages of production. Given the change in plant mission, use of these solvents is no longer necessary. As a result, the halogenated solvent elimination projects, with the exception of refrigerant recycling, have been discontinued.

Regulation of the use of chlorofluorocarbon refrigerants (CFCs) has become increasingly stringent. Recently implemented state and federal regulations forbid the intentional release of CFCs to the atmosphere. In addition, an international agreement calls for CFC manufacturing reductions and eventual discontinuation.

As a first step in the abatement of CFC releases, specifications have been written and requisitions have been submitted for purchase of equipment needed for a refrigerant management system. Refrigerant losses from equipment during servicing and maintenance will be minimized, and refrigerants will be reused after contaminants (oil, water, acid, and solids) have been removed. Other methods of reducing CFC releases are also being considered, and alternative refrigerants will be evaluated as they become available. A training program will be initiated to ensure that adequate certified personnel are available to repair and maintain refrigeration and air conditioning units, as required by upcoming state legislation.

5.4 TREATMENT

The objective of waste treatment is to process and package liquid and solid wastes generated at the site in a safe and effective manner. Treatment may reduce the hazardous properties of the waste or make the waste suitable for shipment and disposal. Waste handling operations involve a multitude of waste types (e.g., TRU, TRU-mixed, low-level, low-level mixed, hazardous, and sanitary) and waste forms (e.g., liquids, sludges, solids, compressible solids). The majority of the process wastes generated at the site are radioactive; thus, treatment and handling facilities have been designed to provide the additional safeguards necessary to effectively manage radioactive wastes. Treatment technologies include thermal, chemical, and physical techniques. Nonradioactive spent oils, solvents, and other recyclable chemicals can be shipped to offsite vendors for treatment or reclamation. Office refuse and uncontaminated construction refuse are placed in the onsite sanitary landfill. Sanitary liquid wastes are treated in the onsite Sewage Treatment Plant. Waste minimization efforts are reducing the amount of waste to be treated and implementing recycling when possible (see Section 5.3). The flow of waste at Rocky Flats is depicted in Figure 18.



Rocky Flats Plant
Radioactive Waste Operations
Figure 18

Treatment activities funded at Rocky Flats include ongoing operations and building and equipment upgrades. These activities are generally associated with one of the five treatment facilities discussed below: Building 374, Building 774, Buildings 776/777, Building 889, or the Sewage Treatment Plant. Projects not associated with these facilities are discussed in Section 5.4.5.

5.4.1 Liquid Waste Treatment Operations - Building 374

Building 374 is used for treatment of chemically contaminated radioactive and nonradioactive wastewater from process, laboratory, and utilities buildings on plant site. The largest sources of water treated in this building are laundry and incidental waters (e.g., pond water and runoff), accounting for half of the approximately 14 million gallons of water processed in Building 374 annually. The volume of water requiring processing in Building 374 is expected to remain constant as transition of the plant mission is carried out. Liquid wastes processed in Building 374 are converted into two types of solid waste (vacuum filter sludge and saltcrete), and distilled water, which is used by Utilities in boilers and cooling towers. Liquid Waste Operations - Building 374 requires a staff of approximately 100 chemical operators, maintenance personnel, analytical laboratory personnel, and radiological protection personnel.

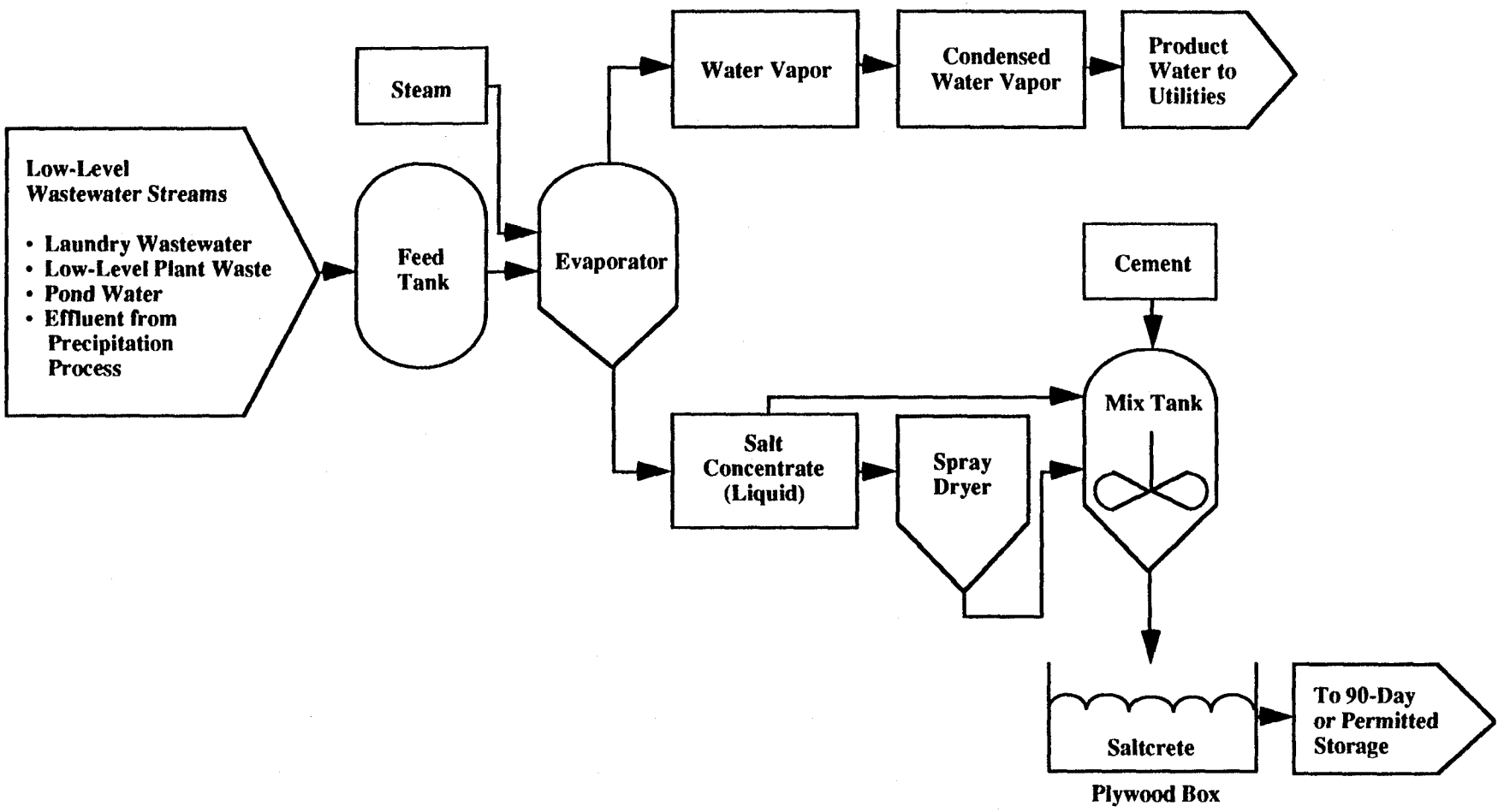
The type of treatment used for each waste stream depends on the chemical constituents and amount of residual radioactivity in the waste stream to be treated. Process wastewater streams are treated in Building 374 with three different processes. Waste streams contaminated with higher levels of radioactivity are treated in a precipitation process, the resultant sludge is solidified, and the clarified water is sent to the evaporator for further treatment. Waste streams contaminated with lower levels of radioactivity are treated in an evaporation process, and the resultant salts are immobilized with cement, as shown in a simplified process diagram in Figure 19. Waste acids are neutralized and filtered, and the resultant sludge is immobilized with cement.

Liquid Waste Operations - Building 374 encompass a variety of activities performed on an ongoing basis in addition to actual waste processing. These activities include:

- Performing RCRA inspections and safety audits
- Maintaining equipment
- Maintaining operator training and qualification
- Developing and maintaining procedures
- Participating in development of site safety plans

Building 374 has been in operation for 15 years. Age has made the facility technically outdated, and equipment upgrades and/or replacement are necessary. Facility upgrades will be implemented through the first two activities discussed below. The third activity addresses treatment of the salt waste form generated by the Building 374 evaporator.

In the future, precipitation waste sludge will be solidified in the microwave melter that is planned for installation in Building 774 (see Section 5.4.2).



Evaporation Process for Low-Level Wastewater Streams

Figure 19

Overall Facility Upgrade (ADS #3829)

Overall facility upgrades will include improvements to much of the process equipment, excluding the evaporator system (which is covered under a different project, discussed below). The project includes upgrades of instrumentation, piping, pumps, and valving for the precipitation process, waste receiving area, neutralization process, and chemical preparation area. Other components of the project include improvement of the sludge filtration/solidification system, repair and improvement of tank berms for secondary containment of tanks, enhancement of the waste transfer data collection system and other support systems, and installation of a new water tank. These improvements will allow the building to operate at design capacity, with less down-time and maintenance. Instrumentation upgrades will enable compliance with stricter reporting requirements.

The following activities were accomplished in FY92:

- Completed project validation review
- Initiated NEPA EA
- Continued design criteria preparation

The following activities are planned for FY93:

- Complete design criteria
- Begin design and engineering

Completion of the overall facility upgrade is planned for FY98.

Building 374 Evaporator (ADS #5178)

The existing Building 374 evaporator is being augmented with a new evaporator in order to increase reliability and capacity. A capacity increase from 14 million gallons per year to 23 million gallons per year is anticipated. The increased capacity will provide additional waste treatment support for plantwide liquid waste streams. The new evaporator will also incorporate design improvements, including (1) use of an alloy that can withstand the high levels of chlorides found in liquid waste streams, (2) replacement of the current spray dryer with thin-film evaporators for further concentrating salts from the evaporator, and (3) installation of a ribbon mixer to blend cement into the concentrate from the thin-film evaporators, creating a solidified waste product.

A large portion of design work was completed in FY92. Phase I equipment will be installed in FY93, including one thin-film evaporator and its associated sludge immobilization system.

Start-up of Phase I equipment is scheduled for FY94. Phase II will include the new evaporator and a second thin-film evaporator/immobilization system. Installation of Phase II equipment is scheduled for FY95, with start-up in FY97. The existing evaporator in Building 374 may be renovated to provide back-up for the new evaporator. This project will begin in FY94 (Scope and Estimate) and will be completed in FY00.

Saltcrete

Saltcrete is the low-level mixed waste form originating from the process wastewater evaporation system in Building 374. The brine resulting from concentration of wastewater by the evaporator is dried to a low-level mixed salt and then blended with brine and cement. The result is a solid and stable waste form called saltcrete, which is packaged for shipment and disposal in plywood half boxes.

The current saltcrete waste form does not meet Nevada Test Site Waste Acceptance Criteria or DOT shipping requirements. A program is in place to correct problems with the waste form. The objectives of the program are as follows:

- Adequately characterize the waste stream into the evaporator process
- Develop an effective and certifiable process for salt cementation
- Sample and characterize the existing inventory of saltcrete
- Reprocess the existing inventory of saltcrete stored on the 904 and 750 Pads to meet Nevada Test Site Waste Acceptance Criteria

The following activities were accomplished in FY92:

- Completed required RCRA inspections of saltcrete stored on the 750 and 904 Pads
- Developed sampling plans for characterization of saltcrete inventories
- Completed sampling of saltcrete inventories for characterization and treatability studies
- Assessed the capability of Building 374 cementing equipment to produce a certifiable waste form
- Completed evaluation of Building 374 saltcrete process deficiencies
- Performed a treatability study to prove that the proposed cementation process will provide a certifiable waste form

The following activities are planned for FY93:

- Commence and complete reprocessing of existing noncertifiable saltcrete
- Submit a waste generator application to the Nevada Test Site
- Ship newly generated saltcrete to the Nevada Test Site

In FY94 and beyond, reprocessing and shipment of certifiable saltcrete will continue. Newly generated certifiable saltcrete will also be shipped to the Nevada Test Site.

5.4.2 Liquid Waste Treatment Operations - Building 774

The facilities in Building 774 are used for treatment of TRU-mixed, low-level mixed, and organic liquid waste streams. Waste streams treated in Building 774 include liquid waste from Building 774 (water from groundwater accumulation system, decontamination showers, utility systems, and non-production systems); miscellaneous solutions from Buildings 559, 371, 771, and 779; plant-generated photographic developer solutions; and organic wastes from Buildings 707, 776, and 777. ADS #3821 supports Liquid Waste Operations - Building

774, funding a staff of approximately 36 chemical operators, maintenance personnel, analytical laboratory personnel, and radiological protection personnel.

Three different treatment processes are used in Building 774. The type of treatment performed depends on the chemical nature of the waste to be treated. Caustic waste and certain neutralized acidic wastes are treated in a two-stage precipitation process. Chemicals are added to the wastewater stream and cause metals such as iron, magnesium, and calcium and radioactive contaminants to precipitate into a semi-solid. Clarified water is drawn off the top, and the precipitate is then dewatered and solidified. Organic wastes are solidified with gypsum cement. Wastes that cannot be treated by either of the above two methods are neutralized and then solidified with cement. A simplified version of the precipitation treatment process used in Building 774 is shown in Figure 20.

The facility also houses a silver recovery process in which silver is recovered from various waste streams generated by photographic developing processes on plant site. Approximately 135,000 gallons of liquid wastes and 500 gallons of organic waste are processed through Building 774 each year.

Liquid Waste Operations - Building 774 encompass a variety of activities and duties, which are performed on an ongoing basis in addition to the actual transfer and processing of wastes. These activities include the following:

- Performing RCRA inspections and safety audits
- Maintaining equipment
- Maintaining operator training and qualification
- Developing and maintaining procedures

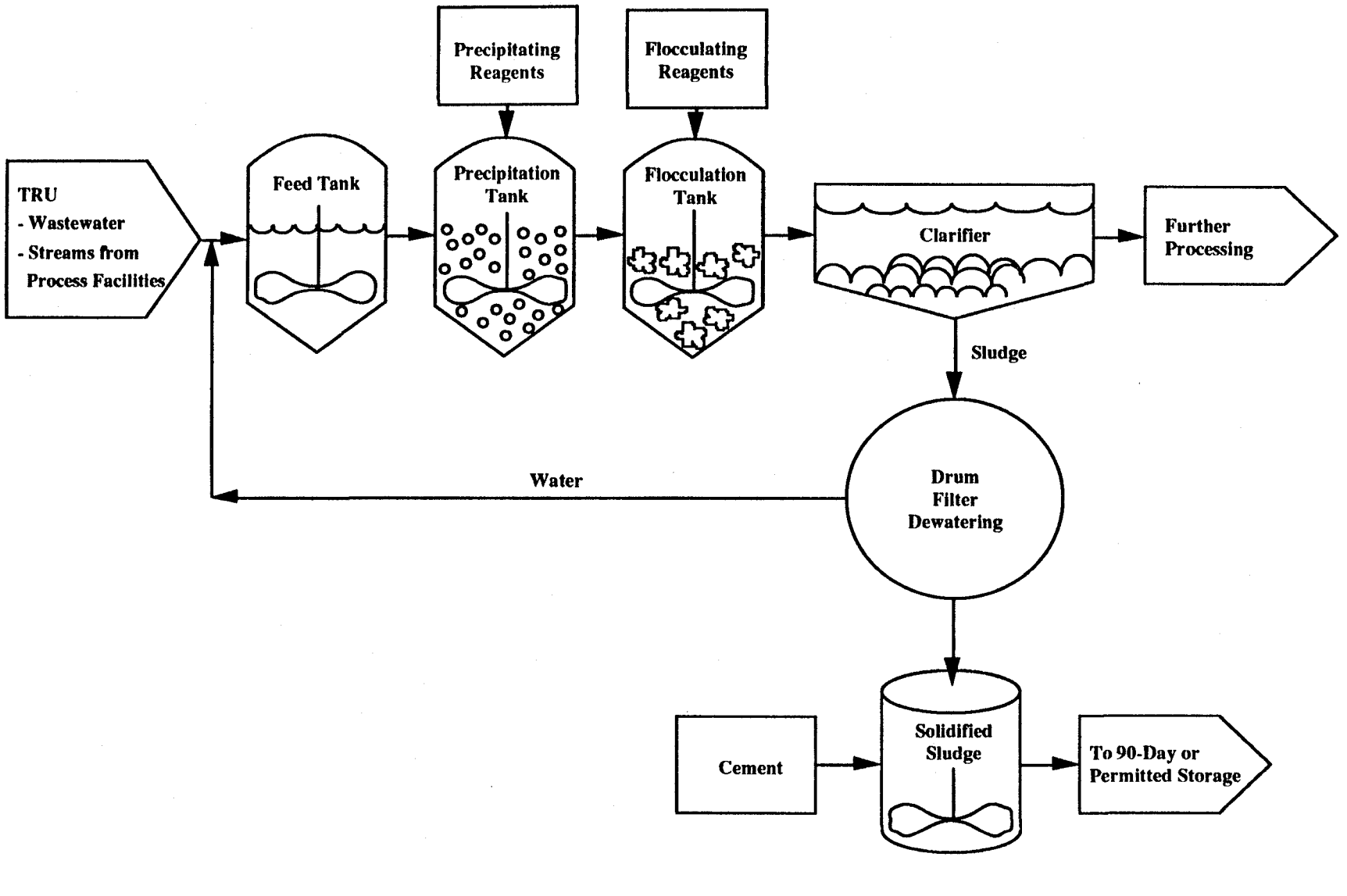
One capital project for Building 774, a microwave melting system for solidification of process sludges produced in Building 774 and Building 374 is planned. The system is described below.

Microwave Solidification Process for Building 774/374 Sludge

The existing precipitation waste sludge cementation process in Buildings 774 and 374 may be replaced with a microwave solidification process. The process will utilize microwave energy to solidify sludge bottoms from the precipitation of process waste from Buildings 774 and 374, thereby eliminating the use of cement, reducing the volume of the waste form, and providing a method for producing waste acceptable for land disposal under RCRA Land Disposal Restrictions. The microwave melting process is currently in the full-scale demonstration phase, which is expected to be complete in FY95 (see Section 6.2).

Conceptual design preparations began in FY92. The following activities are planned for FY93:

- Prove microwave melting technology
- Begin preparation of Scope and Estimate
- Begin NEPA documentation
- Begin hazard classification
- Initiate conceptual design report



Precipitation Treatment Process for TRU Wastewater Streams

Figure 20

Project completion is planned for FY97.

5.4.3 Solid Waste Operations - Buildings 776/777 and 889

Solid waste operations are conducted in Buildings 776/777 (inside PA) and Building 889 (outside PA). Solid Waste Operations conducts routine handling, processing, and packaging of radioactive waste for most of the plant site.

Building 776/777

Building 776 processing includes the following operations: (1) repackaging waste combustibles, metal, glass, and large HEPA filters in the Size Reduction Vault (SRV); (2) adding cement for neutralization to waste filter media, insulation, and glovebox filters in the SRV; (3) size-reducing large items of equipment, machinery, and gloveboxes in the Advanced Size Reduction Facility (ASRF); and (4) compacting soft combustible and light metal wastes in the SARF. Building 777, which is contiguous with Building 776, is now a Waste Operations building and houses several RCRA storage units. The following activities were accomplished in FY92:

- Processed filters
- Supported start-up of SARF
- Fulfilled building safety and radiation safety requirements

The following activities are planned for FY93:

- Process filters
- Support SARF operation
- Fulfill building safety and radiation safety requirements

Several projects to upgrade Building 776 are currently planned to begin in FY93. The ASRF assay system will provide improved accuracy for counting fissile material, thereby making it possible to optimize the amount of waste that can be packaged into a container within the prescribed fissile material limit. This project will make improved use of storage space possible and will reduce overall operating and disposal costs. Installation, testing, and start-up of the assay system will be completed in FY95.

A facility upgrade is also planned for Building 776. Installation of the SARF has reduced the space available for receiving and staging waste. This project will convert 4,800 square feet now used as a maintenance shop into a staging area. The project will also provide an area for manually size-reducing large items of equipment that are low-level waste. This waste must currently be size-reduced in the ASRF, where it is exposed to TRU contamination and becomes TRU waste, which is more difficult and expensive to store and dispose. This project will prevent unnecessary production of TRU waste. The EA was initiated in FY92, and a conceptual design report will be prepared in FY93. Construction, testing, and start-up will be completed in FY96.

Building 889

Building 889 is used for decontamination and volume reduction of uranium-contaminated equipment and other low-level and low-level mixed wastes generated outside the PA. After decontamination, some of the equipment may be available for use at other government facilities. Ducts, drums, combustibles, and other non-reusable items are cut, crushed, or otherwise processed to minimize volume and are packaged as low-level waste. A compactor is used to crush HEPA filters and lightweight metal, and a baler is used for compacting soft low-level waste. Building 889 must be upgraded before it can be returned to fully operational status. This project includes the following:

- Upgrade and rearrangement of equipment
- Upgrade of ventilation
- Building modifications to meet safety requirements

The initial phase of this project, which included a building addition and installation of two 2-stage HEPA filter plenums and a new heating, ventilating, and air conditioning (HVAC) unit, was completed in FY91. Completion of the entire project is planned for FY96.

The following activities were accomplished in FY92:

- Submitted request for Scope and Estimate and funding
- Performed a cost-benefit analysis (based on user knowledge of the Building 889 upgrades required), to include beryllium and all other non-PA generated waste streams

The following activities are planned for FY93:

- Initiate conceptual design report
- Initiate Preliminary Safety Analysis Report (PSAR)
- Initiate NEPA documentation

5.4.4 Sewage Treatment Plant

The Sewage Treatment Plant (STP) is used for treatment of liquid sanitary waste produced at the site. This waste stream consists of wastewater generated from plant cafeterias, lavatory sinks, toilets, showers, and other drains located outside of the process areas. The STP must be operated in accordance with all applicable regulations for sewage treatment plants. Operation of the STP is supported by Base Programs in FY92 and FY93 but will be funded by DOE-EM ADS #3821 beginning in FY94.

Liquid sanitary waste is treated in an activated sludge process. The sludge produced is dried and packaged in lined plywood boxes. The purified water is pumped to ponds on Walnut Creek. packaged sludge is currently stored onsite, pending approval for offsite disposal at the Nevada Test Site. The following tasks are included in STP operation:

1. Observing and monitoring STP processes, and responding to and adjusting treatment plant conditions as necessary
2. Mixing chemicals to maintain effluent quality and solids management

3. Sampling STP streams
4. Monitoring and inspecting plant sewage collection systems
5. Demonstrating compliance with DOE orders and applicable regulations

The STP is undergoing extensive enhancement and upgrade in order to meet NPDES permit requirements and the NPDES FFCA. In FY91, instrumentation upgrades, including sensors, alarms, and process control and monitoring capabilities, were completed. An automatic chlorination/dechlorination system and improvements to the aeration basins were also added in FY91.

The remainder of the project is divided into three phases. Phase 1 involves upgrades to the sludge drying system, including a mechanical sludge dewatering and drying system. Phase 2 consists of upgrades to the electrical power system at the STP, including (1) an addition to Building 995 for more laboratory space, office space, and shower and locker facilities, (2) an extension of Building 998 that will enclose the sand filters to prevent them from freezing, and (3) overall plant upgrades. Phase 3 includes construction of holding tanks that can be used to contain incoming or outgoing water in that the effluent does not meet specifications for treatment in the plant or discharge and nitrification/denitrification capability, which will make it possible to control and reduce the ammonia and nitrate content of water discharged.

The following activities were accomplished in FY92:

- Began construction of the Phase 1 sludge drying bed upgrades
- Initiated preliminary design for Phase 2

The following activities are planned for FY93:

- Complete construction and begin use of Phase 1 upgrades
- Complete final design for Phase 2
- Begin Phase 2 construction
- Obtain new NPDES permit
- Initiate preliminary design for Phase 3 nitrification/denitrification capability

Phase 2 construction is scheduled for completion in FY94. Design for Phase 3 will be completed and construction will begin in FY94. Completion of Phase 3 construction is scheduled for FY95.

5.4.5 New Treatment Facilities

Work is scheduled to begin in FY93 on two new treatment processes/facilities: a new waste processing facility inside the PA and an upgrade of the thermal treatment processing unit (TTPU).

The new waste processing facility is needed to meet the requirements of DOE Order 6430.1A, Wind and Seismic Requirements, which calls for a hardened building. The building will also enable consolidation of waste processing functions that are currently scattered across the plant site and will provide necessary analytical laboratory facilities. The new facility will have capabilities for supercompacting, shredding, immobilizing, and size-

reducing waste; conducting laboratory analyses, radioactivity counts, and real-time radiography (RTR) assessments; hazardous waste destruction; and staging, receiving, and shipping of TRU/TRU-mixed waste.

Preparation for conceptual design and NEPA documentation were initiated in FY92. Engineering feasibility studies will begin in FY93. The new building is scheduled for completion and start-up in FY05.

The TTPU is needed for treatment of mixed waste to meet the requirements of RCRA and the FFCA II for LDR waste. A production demonstration facility was constructed in 1978/79 and operated in a test mode to demonstrate combustion of simulated mixed waste. This TTPU upgrade project will correct process deficiencies and upgrade the facility to meet current regulations. Required upgrades include a flue gas capture system and a new feed system. Preparation of NEPA documentation began in FY92. Installation of new equipment will be completed in FY98. Trials will be conducted in FY99, followed by permitting for processing of mixed RCRA- and TSCA-regulated waste.

5.5 STORAGE

The Rocky Flats site generates several different categories of waste. Each category is uniquely affected by various regulations (e.g., RCRA, CDH regulations, DOE orders), allowing for storage of varying amounts of the different waste types. Specific issues and constraints for storage of the different waste types are discussed below. Stored quantities as of mid-FY92 and permissible capacities are listed in Figure 21.

5.5.1 Storage Issues

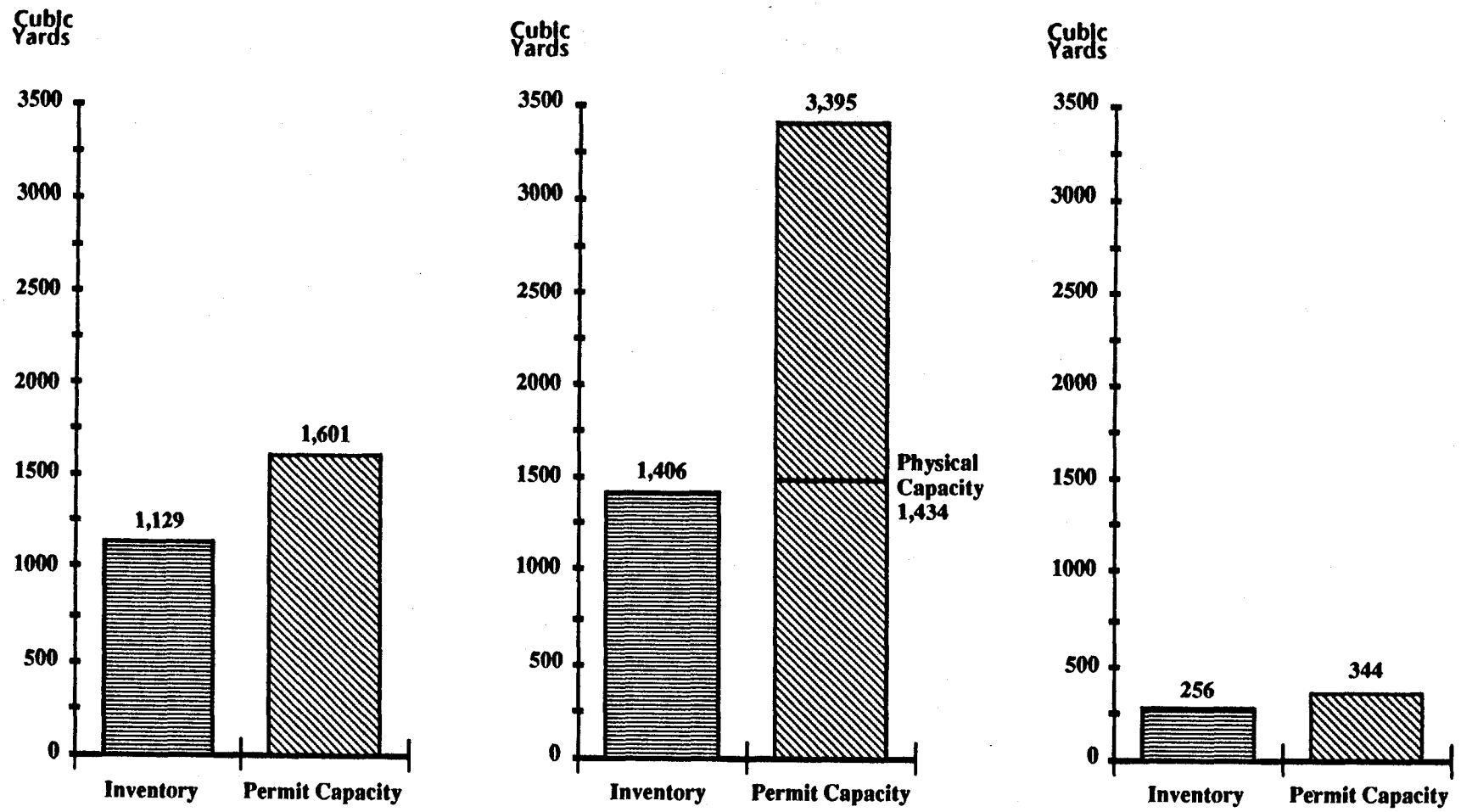
Improved waste characterization is minimizing the amount of waste characterized as mixed, allowing segregation into TRU and low-level fractions that have less restrictive storage and disposal requirements. Several efforts to maximize the use of authorized storage at the site are under way. Aggressive efforts to minimize the amount of waste generated are showing results.

5.5.1.1 TRU-Mixed Waste

Because of the RCRA regulations applicable to hazardous wastes, storage restrictions are placed on quantities of mixed wastes at Rocky Flats. Under the RCRA interim status permit, Rocky Flats is limited to storage of 1,601 cubic yards of TRU-mixed waste; however, Rocky Flats has set its own limit of 1,491 cubic yards as the point at which TRU-mixed waste generating operations would be shut down wherever possible (called the Limiting Condition of Operations [LCO]).

The Supercompactor, which will begin operation in FY93, size-reduces both soft and hard waste, thereby effectively increasing plant storage capacity for TRU-mixed waste.

DOE is developing the necessary NEPA documentation and safety assessments for the near-term option of storing wastes at various DOE sites. This effort will be completed before



Stored RCRA-Regulated Waste Inventories as of May 24, 1992

Figure 21

any final Rocky Flats storage decisions are made. Interim storage of TRU-mixed waste at an appropriate commercial facility is also being investigated.

5.5.1.2 Low-Level Mixed Waste

Rocky Flats currently has a permit specifying storage areas and quantities of low-level mixed waste allowed on plant site. The interim permitted storage capacity for low-level mixed waste at Rocky Flats is 26,992 cubic yards, including interim status units currently storing pondcrete and saltcrete. Excluding pondcrete and saltcrete, present permitted capacity is 3,627 cubic yards, although actual physical storage capacity is only 1,509 cubic yards. Several waste storage expansion projects are planned, including additional capacity for low-level mixed waste. These projects are discussed in Section 5.5.3, Storage Facilities.

5.5.1.3 TSCA-Regulated Waste

Rocky Flats currently stores radioactive and nonradioactive PCB and asbestos wastes, pending treatment and/or disposal. Under TSCA, PCB wastes may be stored for up to one year only. Because no disposal options are currently available for these radioactively contaminated PCB wastes, onsite storage must continue. DOE-RFO has requested guidance from DOE-HQ regarding development of a compliance agreement with EPA that will prescribe measures to be taken by DOE to reach compliance with TSCA storage requirements. EPA Headquarters issued an Advanced Notice of Proposed Rulemaking which addressed revising the regulations that govern storage of radioactively contaminated PCB waste to allow for storage of the waste for longer than a year, as no permitted disposal site is currently available.

5.5.2 Storage Operations

Three storage activities are categorized under Facility Operations and Maintenance (ADS #3821). The responsibilities of the Waste Assay and Shipping/Nondestructive Assay Operations, Hazardous Waste Operations, and Waste Certification organizations are summarized below.

5.5.2.1 Waste Assay and Shipping

Waste Assay and Shipping (WA&S) is responsible for preparation and distribution of various waste containers to onsite as well as offsite generators. Additionally, WA&S ensures that packaged waste types meet specific repository requirements through the use of the RTR unit. WA&S prepares packaged radioactive waste for offsite shipment. Shipment preparation and tracking of various waste types are accomplished in accordance with applicable DOT regulations, EPA requirements, federal and state laws, and DOE orders. TRU and TRU-mixed wastes are prepared, staged, and will be loaded into TRUPACT-II shipping vessels for disposal at WIPP. Low-level and low-level mixed wastes are prepared, staged, and loaded into a common carrier for disposal at the Nevada Test Site.
Waste stored in Building 664 is subject to periodic nuclear material inventories. These inventories are maintained and tracked to ensure that permitted capacities are not exceeded. The WEMS, Safeguards Accountability Network, and the Solid Waste Information

Management System provide building inventory control, nuclear accountability, onsite storage location and shipping information, RCRA information, and offsite shipping information.

Specific operation locations include Buildings 664 and 668. An offsite warehouse has been leased to house the procurement and distribution of new waste containers. Building 668 will be used for onsite staging after containers have been shipped from the warehouse.
The following activities were accomplished in FY92:

- Implemented waste container inspection, numbering, and preparation at Broomfield warehouse for shipment to generators on plant site
- Completed Hazard Assessment Analysis for additional low-level waste storage space
- Prepared over 2,000 low-level waste non-regulated drums for shipment to the Nevada Test Site
- Completed TRUPACT-II dry run for TRUPACT-II loading operations
- Prepared more than 30 TRU waste drums for shipment to WIPP
- Submitted Safety Analysis Report for Building 664 to DOE for review
- Implemented Internal Surveillance Tracking Program
- Completed Nuclear Criticality Safety Audit
- Established inspection and certification training requirements
- Rewrote inspection procedures to incorporate revised waste packaging requirements
- Developed procedures for Deficiency Report and Corrective Action Response processing, surveillance program, and technical procedure development
- Established a WEMS Inventory Control Group
- Verified drum contents to support RCRA permit requirements

The following activities are planned for FY93:

- Provide shipping support for low-level waste being sent to the Nevada Test Site for disposal
- Provide shipping support for shipments of test bins to WIPP for the initial test phase
- Demolish and rebuild drum staging area/Building 668
- Perform real-time radiography of mixed and hazardous wastes for RCRA/CDH characterization requirements
- Continue daily and weekly RCRA inspections at required areas

Waste Assay and Shipping will continue to support resumption of shipping operations for low-level and TRU wastes in FY94 and beyond. These activities will be supported on a 24-hour-per day, five-day per week basis and will be expanded as new programs and issues arise.

5.5.2.2 Nondestructive Assay Operations

The Nondestructive Assay (NDA) Operations organization, funded by Base Programs ADSs #5048 and #5049, provides four major services for waste storage functions. First, this group is responsible for quantifying the radioactivity level present in each newly generated waste

container. This assay process allows the waste to be categorized as TRU or low-level. After the assay, the waste is labeled and stored in an appropriate location. The second function that NDA Operations performs is shipment of wastes between onsite destinations. NDA Operations is responsible for verifying the accuracy of waste labels and onsite shipping records and entering shipment data into the WEMS. Third, NDA Operations is responsible for providing the correct wastes to each treatment process at the right time and monitoring the storage areas in the NDA Operations buildings to ensure compliance with RCRA. Fourth, NDA Operations surveys all onsite tanks containing radioactive liquids and furnishes the tank user with current information on the condition of each tank. NDA Operations also provides regularly scheduled Raschig ring changes for these tanks.

The following activities were accomplished in FY92:

- Overpacked all TSCA-regulated waste drums by the January 31, 1992, deadline
- Reconfigured residue drum storage areas to meet requirements of the Residue Compliance Order by the October 29, 1991, deadline
- Counted more than 1,000 drums to segregate into TRU or low-level waste categories

The services provided by NDA Operations will continue in FY93 and beyond.

In addition to the ongoing operations described above, several projects are under way to upgrade RTR and NDA capabilities. The imaging system for the RTR machine in Building 664 is being replaced with a new, up-to-date system (ADS #5053). In FY92, the NEPA documentation and engineering for the system were completed, and the purchasing process was initiated. The installation and start-up will be completed in FY93.

NDA capabilities for low-level/TRU waste segregation will be improved with the addition of four passive/active counters. A new crate counter will be installed in Building 569 (ADS #5050) and drum counters will be installed in Buildings 771 (ADS #5051), 390 (ADS #5052), and 776 (ADS #5131). NEPA documentation for these systems was completed in FY92 (except for Building 390). Engineering will be initiated in FY93. Procurement is currently planned for FY94 and installation for FY95.

A new confirmatory measurement counter will be installed in Building 991 and will be able to confirm the presence of certain isotopes in 55-gallon drums, as required by DOE Order 5633.3. This counter will follow the same schedule as the passive/active counters.

5.5.2.3 Hazardous Waste Operations

The Hazardous Waste Operations organization is responsible for day-to-day storage, staging, and inspection of all hazardous wastes before offsite transport. The organization is responsible for five RCRA-permitted areas and performance of the duties required by RCRA regulations. Activities include preparation of waste packages to meet disposal site waste acceptance criteria, preparation of waste package documentation required by waste acceptance criteria, inspection of all waste packages to ensure that appropriate waste storage procedures are being followed and that the waste meets applicable waste acceptance criteria,

staging and loading the waste packages onto transportation vehicles for offsite transport, ensuring that stored waste does not exceed permitted storage capacity, and performance of audits, inspections, and other activities to ensure compliance.

Hazardous Waste Operations is also responsible for three storage areas not regulated by RCRA. One area is for low-level liquid waste, another area is for nonregulated waste awaiting offsite shipment, and the third area is for sanitary sewage sludge. This organization is also responsible for ensuring that materials generated from environmental restoration activities are stored in compliance with applicable state and federal regulations.

The following activities were accomplished in FY92:

- Generated site safety plan based on health and safety standards set by OSHA
- Prepared hazardous waste shipping plan
- Prepared more than 400 drums of hazardous waste for offsite shipment and disposal
- Received and implemented new RCRA permit requirements
- Implemented qualification program for waste generators and waste custodians

The following activities are planned for FY93:

- Initiate sitewide asbestos consolidation program
- Expand hazardous waste shipping plan to include more generators
- Establish operations in the Centralized Waste Storage Facility (CWSF)
- Ship the remainder of waste from nonradiologically controlled areas
- Initiate hazardous waste management program for waste generated by environmental restoration activities

In FY94 and beyond, Hazardous Waste Operations will continue to operate and maintain RCRA-permitted storage areas and other storage areas in compliance with the state RCRA permit, the FFCA II for LDR waste, and all federal, state, and local regulations.

5.5.2.4 Waste Certification

All radioactive waste forms (TRU, TRU-mixed, low-level, and low-level mixed) must be certified prior to shipment for offsite disposal. The EG&G Waste Quality Engineering organization is responsible for certification of waste containers. Individual waste containers are certified to ensure that the waste in the container meets the disposal criteria mandated by the disposal site and is documented in accordance with applicable regulatory criteria. Waste that cannot be certified to these criteria is rejected and returned to the generator, who must correct compliance deficiencies.

In addition to certification activities, the Waste Quality Engineering organization provides a variety of support functions to waste generators and other organizations. These activities include procedure review and approval, procedure development (particularly for the Waste Inspection organization), project support (such as for the WIPP Bin-Scale project), and waste surveillance activities.

The following activities were accomplished in FY92:

- Supported Operational Readiness Reviews for Buildings 559 and 707 and internal self-assessments for the TRUPACT-II Loading Operation and the Supercompaction and Reduction Facility (SARF)
- Initiated engineering support for medical waste to determine appropriate disposal practices
- Conducted quality assurance analysis and developed a quality assurance implementation plan for the waste certification program
- Developed administrative, technical, and waste records management procedures
- Implemented a waste surveillance program
- Developed procedures for issuing Deficiency Reports and Corrective Action Requests
- Established interface within the Environmental Management organization to manage waste generated during environmental characterization and restoration operations

The following activities are planned for FY93:

- Implement waste certification quality assurance program in accordance with quality assurance implementation plan schedules
- Define, document, and maintain certification programs for low-level, TRU, and environmental wastes
- Develop an annual report for FY92 describing the mission, functions, and activities of the Waste Quality Engineering organization

Waste Quality Engineering support for waste and environmental programs will continue in FY93 and will be broadened as programs continue to expand and as issues arise.

5.5.3 Storage Facilities

5.5.3.1 Low-Level Mixed Waste Storage Facility

Planning for a new 25,000-square-foot storage facility for low-level mixed waste began in FY92. As a result of the change in mission, work has been suspended pending re-evaluation of site storage requirements. The new facility would be used as a temporary staging area for saltcrete, sewage sludge, and uranium oxide, pending shipment to the Nevada Test Site. The facility would be located near the 904 Pad and would serve to centralize the low-level mixed waste storage function. This activity is managed under ADS #3822, New Facility Planning. A Scope and Estimate was initiated in FY92.

5.5.3.2 Central Waste Storage Facility

Design engineering for the new 25,000-square-foot Central Waste Storage Facility was completed in FY92 (ADS #5138). However, as a result of the change in mission, a less permanent facility is required and design engineering work is being modified to incorporate current needs. Construction of the facility is a high priority project necessary to alleviate

the storage capacity shortage at Rocky Flats and is planned for completion in FY93. The new facility will safely store an additional 4,300 cubic yards of low-level mixed waste.

5.5.3.3 Residue Drum Storage Facility

Construction of a new 48,000-square-foot building (ADS #5064) for residue drum management and storage is planned. This facility will provide a centralized location for residue drum storage and will handle 7,500 drums. It has been designed to meet all DOE standards for air filtration, effluent handling, and waste filtration.

The following activities were accomplished in FY92:

- Began architect/engineer selection process
- Updated design criteria
- Completed NEPA EA

In FY93, a detailed building design will be initiated by an architect/engineering firm. In FY94, design work will be completed, the construction contract will be awarded, and construction will begin. Construction will be completed in FY97, and the building will be operational in FY98.

5.6 DISPOSAL

All wastes generated at Rocky Flats must eventually be disposed at an approved disposal facility. Only sanitary solid waste may be disposed on plant site; Rocky Flats manages its own sanitary landfill for this purpose. All hazardous, radioactive, and mixed wastes must be shipped offsite to approved disposal facilities. Transportation of this waste is performed in compliance with all applicable DOE and DOT requirements.

The Land Disposal Restrictions as authorized through the Hazardous and Solid Waste Amendments to RCRA prohibit disposal of certain untreated hazardous and mixed waste either in or on the land unless it can be demonstrated that the toxicity of the waste has been diminished or that there will be no significant migration of hazardous constituents for as long as the waste remains hazardous. Waste disposal sites must be permitted to dispose hazardous and/or mixed wastes. Neither the Nevada Test Site nor WIPP are currently permitted to accept mixed waste.

Disposal activities vary for each waste type, and discussions of each disposal activity are presented below.

5.6.1 Hazardous Wastes

Hazardous waste generated in areas that have never contained radioactive materials is currently shipped to commercial vendors for treatment, recycle, and disposal. Shipment of the backlog will be completed in FY93. Hazardous waste generated in radiologically controlled areas must be subjected to more rigorous administrative and physical controls to

verify that it is not radioactively contaminated and therefore eligible for offsite commercial disposal.

5.6.2 TSCA-Regulated Wastes

TSCA-regulated PCB waste generated in areas that have never contained radioactive materials is currently shipped to commercial vendors for treatment and disposal. A disposal facility for nonradioactive asbestos waste has not yet been identified, although the Nevada Test Site may become available for disposal of this waste.

Radioactive PCB waste will require treatment and disposal at another DOE facility when capacity becomes available. If a variance from DOE Order 5820.2A can be granted, these wastes may also be treated at a commercial facility at such time as one becomes permitted and available. DOE Order 5820.2A currently prohibits the shipment of any waste contaminated with radionuclides to commercial facilities. A plan for disposal of radioactive PCB waste will be finalized upon resolution of these issues.

Radioactive asbestos waste will eventually be shipped to the Nevada Test Site for disposal. However, the Nevada Test Site is not yet authorized to receive and dispose radioactive asbestos waste. A timetable for shipment of asbestos waste to the Nevada Test Site is being developed.

5.6.3 Low-Level Wastes

In July 1990, the DOE Nevada Field Office suspended shipments of low-level waste to the Nevada Test Site pending implementation of additional process controls and program improvements that would bring Rocky Flats into full compliance with increasingly stringent waste acceptance criteria. In FY91, the Waste Programs organization at Rocky Flats completed these program improvements and enhanced the overall low-level waste certification program. Program improvements included the following:

- Revision of the waste container data collection program
- Development of a new training program for waste generators
- Revision of operational procedures for waste packaging
- Enhancement of inspections and program surveillance
- Publication of plantwide waste stream characterization documents

These activities were initiated in radioactive waste generating buildings, beginning in late FY91. Shipments of newly generated low-level waste from Buildings 559 and 528 resumed in late FY92; a plan for certification of the stored inventory of low-level waste was also formulated. In FY93, all newly generated low-level waste from buildings throughout the plant will be shipped to the Nevada Test Site.

5.6.4 Low-Level Mixed Wastes

Low-level mixed waste shipments to the Nevada Test Site were suspended in May 1990 when additional Land Disposal Restrictions went into effect. In order to transport and

receive these wastes, the Nevada Test Site was required to prepare an Environmental Assessment, obtain a Finding of No Significant Impact (FONSI), and develop and implement a waste analysis/characterization plan. These activities are expected to be completed in FY93. In addition, the Nevada Test Site must receive RCRA interim status or be permitted and complete minimum technology requirement upgrades. Completion of these requirements is anticipated in FY93.

Rocky Flats must submit a generator application for low-level mixed wastes in preparation for waste shipments to the Nevada Test Site. In FY93, a generator application for pondcrete and saltcrete will be prepared and shipments will be initiated.

5.6.5 TRU/TRU-Mixed Waste

TRU and TRU-mixed waste generated at Rocky Flats before 1970 was buried at the Idaho National Engineering Laboratory (INEL). After 1970, this waste type was shipped to INEL for interim storage, pending development of a permanent disposal facility. As a result of delays in opening the WIPP facility, the State of Idaho closed its borders in October 1988 to further waste shipments from Rocky Flats, forcing Rocky Flats to continue storing TRU/ TRU-mixed waste.

The WIPP facility is expected to begin receiving Rocky Flats waste shipments for use in the bin-scale contact-handled TRU waste test program in late FY92. In order to provide waste for use in this test phase, certain waste characterization requirements must be met. Rocky Flats will be required to perform nondestructive assay and inspection; analytical, visual, and physical characterization; and segregation of the contents of each container of TRU waste. Rocky Flats is currently developing procedures and a training and evaluation program to meet the test program requirements. These requirements have been imposed by the Quality Assurance Program Plan (QAPP) for the WIPP Waste Characterization Program, the EPA No Migration Determination, and the New Mexico Environment Department.

The characterization program, including all preparatory steps, samples, and analyses, must be controlled in accordance with WIPP requirements. Basic criteria are identified in the QAPP for the WIPP Waste Characterization Program. Rocky Flats is developing a detailed description of management, waste certification, and waste characterization functions and additional quality-related objectives to meet the requirements of the WIPP program.

When all of the above requirements have been met, Rocky Flats can begin to prepare bins for shipment to the WIPP facility. It is anticipated that up to 65 bins of waste will be prepared for shipment to WIPP. These bins will be overpacked in a standard waste box and shipped in TRUPACT-II containers.

A facility to load TRUPACT-II containers onto trucks is needed in the near term to support the planned bin test shipments to WIPP. Building 664 has been modified to accommodate shipment of TRUPACT-II containers. This is an interim measure that will be used for up to six years and is scheduled to be operational in late FY92. The long-term facility will be designed to consolidate TRU waste operations as well as to provide a TRUPACT-II loading facility.

Rocky Flats continued to meet the WIPP Waste Acceptance Criteria for certification for Rocky Flats TRU waste generated and packaged during FY92. These wastes will be ready for future shipments to WIPP.

5.6.6 Sanitary Wastes

The onsite sanitary landfill accepts nonhazardous, nonradioactive solid waste generated on plant site. Operation of the landfill involves site excavation as well as depositing and covering solid wastes.

The landfill, which began operations in 1968 and is expected to reach capacity in late FY96, will be replaced by a new landfill (ADS #3828). Closure of the existing landfill is a requirement of the IAG (see Environmental Restoration section). Until the new landfill is operational, steps are being taken to extend the life of the current landfill:

- Paper is being recycled whenever possible.
- Solid waste will be contoured and mounded to provide additional capacity.

The new sanitary landfill will consist of up to four cells. Each of the cells will be constructed as needed. It is anticipated that each cell will have an operational life of five years.

The following activities were accomplished in FY92:

- Completed Enhanced Design Criteria
- Submitted Environmental Assessment to DOE-HQ
- Submitted permit application (Certificate of Designation) to Jefferson County and CDH for review
- Completed hazard classification

The following activities are planned for FY93:

- Complete engineering for design of first cell and supporting infrastructure (roads, balers, building, alarms)
- Complete NEPA process
- Initiate and complete preliminary design; construction is expected to start in FY94 and be completed in FY95
- Award construction contract

5.7 RESIDUE MANAGEMENT

The scope and intent of the site's residues program has shifted during the last few years from a plutonium recovery project to a waste treatment and disposal project. Also, the program is the only substantial new waste management engineering project for the near future; thus, although it may not have a large role in the FY93 SSP, it will play a significant role in future years.

The program includes some complicated technical projects that must not be confused with plutonium recovery or weapons production projects. The most effective method for avoiding such confusion is to keep the public informed about the projects proposed in the site's program to manage residues.

Because this program contains new activities for FY93, some technical, historical, and regulatory background is provided.

5.7.1 Definition and Categorization

Residues are defined by DOE as by-products of production processes that contained amounts of actinides (plutonium, uranium, americium, or neptunium) considered economically recoverable at the time of their generation. If a residue contains one or more RCRA-regulated constituents or exhibits a RCRA-defined hazardous characteristic, it is classified as a mixed residue. The term "mixed" is used in the same sense as for TRU and low-level wastes, referring to a radioactive waste component mixed with a hazardous waste component or having a certain regulated hazardous characteristic. Currently, if any one package of a given residue type is found to be mixed, then all such residues are considered mixed until they can be characterized and a final determination can be made. Residues with incompletely identified constituents are also considered mixed, pending further analysis and characterization.

5.7.2 Mixed Residue Management and Legal Environment

In the past, residues have not been considered by DOE as a waste form. Instead, they have been stored for recovery of plutonium. However, the management objectives of the residue program were changed dramatically by two events. First, a changing world political situation has led to a reduced need for stockpiled nuclear weapons and has thus reduced the demand for plutonium, which has made recovery of plutonium less economically desirable. Second, the Sierra Club Legal Defense Fund has twice successfully sued DOE to change the way that Rocky Flats residues are managed. In the first suit, it was ruled that mixed residues are regulated under RCRA as a waste. In the second suit, it was ordered that all mixed residues be stored in RCRA-permitted areas within two years of the date of the ruling. DOE must also comply with the State of Colorado Compliance Order 91-07-31-01 issued July 31, 1991.

The Compliance Order addresses management of mixed residues in accordance with Colorado Hazardous Waste Regulations. In the Compliance Order, CDH commented on, revised, and added to the requirements and schedules identified in the Rocky Flats Mixed Residues Compliance Plan (MRCP) submitted to CDH on September 28, 1990. The Mixed Residues Compliance Plan was submitted to CDH as required in Settlement Agreement and Compliance Order on Consent No. 89-10-30-01 (Residue Compliance Agreement) issued November 3, 1989. The MRCP included activities scheduled to bring mixed residues into compliance with Colorado Hazardous Waste Regulations. The schedule changes included in the Compliance Order supersede the MRCP schedules. The Compliance Order is presently being revised into an Amended Compliance Order, in conjunction with negotiations with CDH toward a Consent Decree.

The Compliance Order contains several requirements, including stipulations for waste generator training, chemical analyses for residues, storage of newly generated mixed residue materials (such as those generated from decontamination and decommissioning activities), treatment of backlog mixed residues, and physical requirements for residue storage space. It also outlines a schedule for the preparation and submittal to CDH of the various reports enumerated in Section 5.7.4. Elimination, proper handling, and storage of backlog mixed residues are waste management activities, as these residues constitute regulated waste materials. The safe treatment and elimination of these mixed residues is part of a plantwide effort to eventually remove all plutonium-bearing materials from the site. The Compliance Order also stipulates that all mixed residue materials be removed from Rocky Flats by January 1, 1999, unless sufficient detailed information is presented to support a revised schedule.

5.7.3 Non-Mixed Residues

The Compliance Order directly addresses only mixed residues; non-mixed residues are not regulated by RCRA. However, the residue management program to eliminate plutonium-bearing materials at Rocky Flats is designed to manage all residues (mixed and non-mixed) that need processing or conversion into waste forms that meet waste acceptance criteria.

5.7.4 Program Overview

The program to manage residues is being developed to remove the current residue backlog in a cost-effective manner while complying with all applicable regulations. The overall program includes all engineering and support activities (such as permitting) necessary to reach regulatory goals. One main component of the program is the Residue Elimination Project (REP), which encompasses all of the plans for residues to be treated onsite. The REP will be configured as a residue treatment process rather than as a plutonium recovery process.

The primary objective of REP is to convert residues into disposable waste forms by either mechanical and chemical reprocessing or repackaging. Mechanical processing provides methods to concentrate plutonium into a smaller residue volume. Chemical processing extracts plutonium and other transuranic elements from residues, leaving TRU, low-level, and mixed wastes suitable for disposal in DOE-approved repositories. The extracted plutonium will be in a form suitable for safe shipment and long-term storage at another DOE site. Initially, REP is envisioned to include aqueous acid processing modules, a miscellaneous residue processing module, a drum staging area, and a liquid effluent pretreatment process. Processes to treat combustibles and chloride salts will be proposed following completion of demonstration tests and further studies.

Support for decontamination and decommissioning of Rocky Flats is a significant consideration in the development of these plans for residues. The overall plan is also investigating the feasibility of using existing and modified facilities to eliminate the hazardous constituents of selected mixed residues.

The second component of the program is overall management of residue compliance issues. The purpose of this portion of the residue management program is to ensure that handling and storage of mixed residues are in compliance with the Compliance Order, RCRA permit conditions (when the existing RCRA permit is modified), and Colorado Hazardous Waste Regulations. This program management group also assumes reporting responsibilities for regulators regarding mixed residues issues and concerns.

The following activities were accomplished in FY92:

- Submitted Backlog Residues Hazardous Waste Determination Status Report to CDH on February 26, 1992
- Submitted Backlog Residues Analytical Plan to CDH on March 31, 1992
- Submitted Mixed Residues Reduction Report to CDH on February 28, 1992
- Submitted Mixed Residues Tank System Management Plan to CDH on March 31, 1992
- Submitted RCRA permit modification for mixed residues on June 30, 1992
- Began upgrades to mixed residue tank systems and storage areas
- Continued preparation of NEPA documentation for REP
- Continued preconceptual engineering design for REP
- Continued negotiation of Amended Compliance Order and Federal Consent Decree

The following activities are planned for FY93:

- Complete study of existing facilities potentially available and appropriate for reuse
- Identify required facility modifications
- Begin re-evaluation of residues for hazardous constituents
- Bring residue tanks and storage areas into compliance within permit conditions
- Obtain RCRA permit for mixed residues
- Begin implementation of Backlog Residues Analytical Plan
- Begin characterization of mixed residues
- Begin development of sampling methodologies for some mixed residues

Planning activities, NEPA and RCRA permitting, process support, sampling and analysis efforts, completion of material balance data bases, extensive analysis to optimize selected processes, and preparation of line item funding requests for the REP project will continue in FY94 and beyond. Closure of some mixed residue storage areas and treatment units may also occur in FY94. Line item funding is anticipated in FY95. After funding is obtained, detailed engineering, construction, testing, and operation of the modified and new facilities may begin. Treatment processes for the elimination of RCRA characteristics in mixed residues in current facilities is scheduled to begin in FY95. Treatment of residues via new or modified processes in existing or modified facilities is scheduled to begin in FY99.

6.0 TECHNOLOGY DEVELOPMENT

6.1 OVERVIEW

Technology development is a systematic approach for identifying, testing, evaluating, demonstrating, and implementing innovative or existing technologies that will enable Rocky Flats to better satisfy established goals in the areas of environmental management and waste treatment and storage.

The Technology Development program is managed at DOE-HQ through the DOE Office of Technology Development. The principal mission of DOE Office of Technology Development is to provide new and improved technologies by increasing investment in and improving the management and coordination of DOE's technology development activities. This mission will be accomplished through close cooperation with the Waste Management and Environmental Restoration offices at DOE-HQ and by using all internal and external resources available. Technology development activities at the site are funded under Technical Task Plans (TTPs).

Technology development is a phased process in which individual technologies undergo rigorous evaluation before advancing from one phase to the next. Following problem prioritization and technology ranking and selection, a technology must pass through the following six phases before including implementation into routine operations:

1. Basic research and development
2. Applied research and development
3. Process development
4. Demonstration
5. Testing and evaluation
6. Implementation

The Rocky Flats Technology Development program is involved primarily with phases 2 through 6.

Given the nature of research and development, relatively few technologies that are investigated in the early stages of development are suitable for full implementation. Therefore, to ensure that environmental restoration and waste management needs are met at Rocky Flats, several technologies that address the same problem may be investigated. As the technologies progress through the development phases, those that prove to be technically unsuitable are eliminated from future funding and development. Also, funding may be limited, resulting in some projects being deferred or eliminated so that more promising projects can be supported. It is expected that at least one technology addressing a given problem will be successfully developed and implemented into routine operations. The following discussion summarizes the technology development activities that are currently planned at Rocky Flats.

6.2 TECHNOLOGIES IN SUPPORT OF FFCA II FOR LDR WASTE

The primary objective of this group of activities is to develop technologies to treat Rocky Flats wastes that are categorized as Land Disposal Restricted (LDR). A Comprehensive Treatment and Management Plan (CTMP) was submitted to EPA on June 10, 1992, to satisfy a reporting requirement of the FFCA II for LDR waste (see Section 5.2.2.4). Rocky Flats has numerous forms of LDR waste (excluding residues) that have been grouped into waste treatment categories, each with an identified waste treatment system. These six waste treatment systems utilize various combinations of technologies that form the basis of the CTMP. The treatment systems, technology options, and waste streams are listed in Table 3.

Table 3
Baseline Treatment Technology Systems for Low-Level Mixed Waste Streams

Waste Treatment System	Technology Option	Waste Stream
Buildings 374/774 Treatment System		
Short-term solution	Improved cementation	Bypass sludge Evaporation salts
Long-term solution	Waste minimization + drying + polymer solidification	Saltcrete Evaporation salts
Long-term solution	Drying + microwave solidification	Bypass sludge
Miscellaneous Waste Form Treatment System		
System (1)	Neutralization + cementation	Acid Analytical laboratory solutions
System (2)	Cementation	Beryllium fines Backlog fluidized bed incinerator ash Silver nitrate
Solar Evaporation Pond Cleanout Treatment System	Mechanical dewatering + cementation	Pond sludge Backlog saltcrete
Solidified Bypass Sludge Treatment System	Microwave solidification	Solidified bypass sludge

Table 3 (continued)

Waste Treatment System	Technology Option	Waste Stream
Surface Organic Removal, Bulk Lead and Leaded Glove Treatment System	Volatilization + microencapsulation	Glass and lead Combustibles Glovebox parts Heavy metals Metal Bulk items from other systems
Solvent-Contaminated Waste Treatment System	**Thermal Option:** Sorting (unacceptable material to go to organic removal system) + fluidized bed unit + off-gas capture + microwave solidification **Non-Thermal Options:** (combinations of the following technologies will constitute a "treatment system" for these wastes) Alkaline chlorination Biodegradation Catalytic chemical oxidation process Cementation Distillation Macroencapsulation Mediated electrochemical oxidation process Silent discharge plasma Supercritical carbon dioxide extraction Supercritical water oxidation Ultraviolet (UV) oxidation Volatilization	Cemented composite chips Combustibles Cut-off sludge Cyanides Electrochemical milling sludge (backlog) Excess chemicals Fluidized bed incinerator oil Filters Insulation Miscellaneous liquids Organics - discard level Paints Particulate sludge Polychlorinated biphenyl (PCB) liquids PCB solids Roaster oxide Sand slag, and crucible slag Soil and cleanup debris Solidified organics turnings Used absorbents effluent from other systems

6.2.1 Technologies Under Development

Individual treatment technologies for LDR waste are briefly described below.

Microwave Solidification (TTP #101201)

The objective of the Microwave Solidification Project is to develop design criteria necessary for treatment of precipitation sludge from the liquid waste treatment facilities presently in operation in Buildings 374 and 774. Upon project completion, construction of a microwave solidification unit is planned for Building 774. Waste products will be subjected to Toxicity Characteristic Leaching Procedure (TCLP), free liquid, and fine particulate analyses to determine the optimum operational conditions and whether the waste form produced meets waste acceptance criteria.

The following activities were accomplished in FY92:

- Completed review of regulatory compliance parameters for the demonstration-scale system
- Updated and revised project and test plan, including quality criteria
- Continued pilot-scale testing on nonradioactive waste

The following activities are planned for FY93:

- Characterize bulk chemical and physical properties of solidified bypass sludge
- Document plutonium volatility parameters and impacts on system performance and operation
- Evaluate specific ancillary equipment options and designs, specifically drum hoist, microwave generator, insulation cage, choke design, upper cavity, and dryer

At the end of FY93, a decision will be made as to whether or not implementation should proceed. If the Microwave Solidification Project is pursued, future activities will include updating and revising the Project and Test Plan, finalizing design criteria, preparing the engineering scope and estimate, and initiating implementation of the program. Full-scale demonstration tests are planned for completion in FY95.

Solidification Development for Sludges, Salts, and Ash (TTP #101202)

Solidification of waste with cement is a widely used waste treatment technology that is cost-effective and does not require extensive development work relative to emerging technologies. The goal of this study is to develop a cementation process that will efficiently and consistently produce durable waste forms that meet RCRA requirements and all applicable transportation and waste acceptance criteria.

The following activities were accomplished in FY92:

- Submitted NEPA documentation to DOE-HQ for bench-scale studies
- Generated development plan and schedules for Building 374 waste streams
- Generated development plan and schedules for target LDR wastes

- Released contract to analytical laboratory for analytical characterization
- Updated test plans for development efforts on Building 374 cementation processes

The following activities are planned for FY93:

- Complete nonradioactive laboratory studies for Building 374 cementation process
- Complete bench-scale studies for radioactive saltcrete process waste
- Complete evaluation reports
- Update test plans

In FY94 and beyond, laboratory studies in support of development of a new cementation process for waste streams that are not currently being cemented will be completed. Laboratory studies will be followed by bench-scale and pilot-scale studies of this process. Implementation is expected to begin in late FY95 or early FY96.

Incineration Alternatives (TTP #101205)

Attempts to obtain permits for incineration technology have repeatedly failed throughout the country. Given the possibility that incineration will not be used for destruction of combustible wastes and residues, other methods must be developed and implemented. This project will provide for identification, development, testing, and evaluation of chemical and/or biological process alternatives to incineration for mixed organic wastes. Wastes and residues suitable for these treatments include low-level mixed waste oil, paper and cardboard, and filters.

The following activities were accomplished in FY92:

- Completed laboratory development studies on oil
- Completed project management plan
- Re-evaluated potential technologies

The following activities are planned for FY93:

- Complete laboratory studies on solid wastes
- Evaluate results of developmental work
- Define preliminary conceptual design for tests on nonradioactive materials

Work will continue on engineering, fabrication, and installation of a pilot-scale system for nonradioactive wastes. Subsequently, pilot-scale tests will be initiated and test results will be evaluated. The pilot-scale system for radioactive wastes will be engineered and fabricated while appropriate wastes are being characterized for the tests. Pilot-scale testing will be completed by FY99.

Thermal Treatment Process Unit (TTP #111202)

The objective of the thermal treatment process unit (TTPU) project is to develop a new, state-of-the-art, low-temperature fluidized bed unit with off-gas capture or conventional

continuous off-gas treatment and built-in safeguards to meet all federal and state environmental regulations and Rocky Flats Waste Quality Engineering requirements. Development of the TTPU will be accomplished by drawing upon the extensive experience gained from plant personnel who worked on the bench-, pilot-, and demonstration-scale fluidized bed incinerators operated at Rocky Flats in the late 1970s and early 1980s. Benefits of pursuing this technology development project include achieving compliance with the requirements of the FFCA II for LDR waste through the use of a proven technology specifically adapted to the needs of treating mixed waste at the plant.

The following activities were accomplished in FY92:

- Completed study of off-gas capture for utilization during incineration of mixed waste
- Consulted DOE Morgantown Energy Technology Center on performing an evaluation of three fluidized bed systems
- Completed report identifying the most effective off-gas control for conventional incineration off-gas
- Explored private sector for off-gas technology implementation
- Completed initial plutonium oxyhydroxide volatility studies

The following activities are planned for FY93:

- Perform advanced volatility studies
- Establish physical space requirements for the FBU
- Complete development of production-scale FBU
- Complete bench-scale work on feeder and primary reactor
- Generate a physical model bid package

TTPU construction and start-up operational testing will be completed by FY99. Permitting and project completion are expected by FY00.

Polymer Solidification (TTP #111203)

The objective of this task is to develop a polymer extrusion process for water soluble salt waste that is compatible with Rocky Flats' new Waste System Evaporator (WSE) project upgrades in Building 374 and will consistently produce a certifiable waste form. Polymer encapsulation of mixed wastes produces a superior waste form with much less volume increase than cementation. The capability of the polymer extrusion process to adequately immobilize actual Rocky Flats salt waste must be demonstrated in both laboratory-scale studies on simulated wastes and in bench-scale studies on actual wastes. The solidified waste form must meet all applicable regulatory requirements, including RCRA Land Disposal Restrictions requirements, DOT regulations, and Rocky Flats internal quality standards.

The following activities were accomplished in FY92:

- Submitted NEPA documentation for bench-scale studies to DOE-HQ
- Completed report documenting literature search results

- Completed treatment plans and schedules for development of polymer solidification technologies for LDR waste
- Updated test plans
- Completed laboratory studies demonstrating feasibility of immobilizing heavy metals in polymers
- Completed evaluation reports
- Procured laboratory equipment

The following activities are planned for FY93:

- Complete required NEPA documentation for pilot plant tests
- Select appropriate drying technology for use with polymer extrusion process
- Generate report documenting verification that dried salt for selected drying technology can be extruded
- Update test plans
- Complete bench-scale studies on Building 374 nitrate salts
- Complete evaluation reports

A pilot-scale demonstration of the polymer extrusion process will be conducted at another DOE facility to develop design information. The long-term stability of the polyethylene waste form will be investigated. Pilot-scale studies of polymer encapsulation will be completed by the end of FY95, followed by an implementation decision. Implementation will be completed by the end of FY98.

Surface Organic Contaminant Removal (TTP #121204)

The overall objective of this task is to identify commercially available organic removal technologies and to determine their feasibility and applicability to treat RCRA LDR waste so that it can be stored and disposed in compliance with RCRA. Technologies under investigation include supercritical/liquid carbon dioxide extraction, volatilization/cleaning, and low-temperature thermal stripping.

The following activities were accomplished in FY92:

- Procured liquid carbon dioxide extraction system
- Conducted liquid carbon dioxide extraction system NEPA review

The following activities are planned for FY93:

- Conduct liquid carbon dioxide waste stream feasibility study
- Develop liquid carbon dioxide test plan
- Prepare laboratory space, and install liquid carbon dioxide extraction system
- Complete volatilization/cleaning literature search and technology assessment
- Issue technology status report on volatilization
- Make go/no go decision on pursuing volatilization technologies

The test plan for liquid carbon dioxide extraction will be completed by the end of FY93. Routine operating procedures will be developed and laboratory-scale tests will begin during

FY94. The demonstration will be completed during FY95, and implementation will begin if the technology is selected.

Controlled Air Incineration

The objective of the controlled air incinerator program is to develop a combustion process with off-gas capture or conventional continuous off-gas treatment and built-in safeguards to treat RCRA LDR waste. The controlled air incinerator program is funded under Waste Management ADS #3812. This process would produce a waste form that meets all federal and state environmental and transportation regulations, applicable disposal facility waste acceptance criteria, and Rocky Flats Waste Quality Engineering requirements. Targeted waste streams include combustibles and noncombustible mixed wastes.

The following activities were accomplished in FY92:

- Completed final report on off-gas capture studies
- Selected controlled air incinerator off-gas capture/treatment technology

In FY93, incineration technologies for Rocky Flats mixed wastes will be further investigated. If the controlled air incinerator technology is selected, Rocky Flats' efforts will be integrated with those at Los Alamos National Laboratory. No activities beyond FY93 are currently planned.

Investigation of Additional Technologies (TTP #121203)

The primary objective of this task is to provide technology evaluation and investigation resources as needed for new technology alternatives that may be identified during the development and implementation of the CTMP.

Nitric Acid Recycle/Nitrate Destruction (TTP #111204)

The present cementation practice of immobilizing alkaline nitrate salts into a waste form called saltcrete requires a high cement/salt ratio. In addition, the resultant waste form may not satisfy future limitations on leachate quantities. Furthermore, laws that regulate land disposal of nitrate compounds are becoming increasingly restrictive, and such disposal may be banned in future years. The objective of this task is to investigate and identify commercially available thermal and chemical treatment technologies to remove or destroy nitrate compounds. Technologies under evaluation include nitric acid recycle, electrolytic decomposition of nitric acid, and alternative solidification processes for associated waste solids.

The following activities were accomplished in FY92:

- Issued contracts for technical support
- Continued pilot-scale demonstration of nitric acid recovery at Los Alamos National Laboratory (LANL)

The following activities are planned for FY93:

- Complete biodenitrification studies at the University of Colorado
- Complete nitric acid distillation modeling
- Complete "proof of principle" for electrolytic decomposition of nitric acid

Activities for FY94 and beyond will depend on the outcome of preliminary investigations.

Analytical Characterization of Mixed Waste (TTP #111205)

The objective of this task is to examine FFCA II for LDR waste treatment technologies and determine what specialized sampling and analytical methods are required to adequately characterize waste forms and products. Commercial equipment and established procedures will be sought and utilized to the greatest extent possible. The task approach is designed to minimize development time and address critical priority characterization needs first.

The following activities were accomplished in FY92:

- Delivered analytical plans
- Completed analytical methods literature search
- Completed experimental analytical methods design
- Delivered status report

In the future, FY92 tasks will be expanded as required.

6.3 DOE COMPLEX TECHNOLOGY INTEGRATION SUPPORT

The primary objective of this group of activities is to coordinate and integrate Technology Development activities at Rocky Flats and throughout the DOE Weapons Complex.

Industrial Workshops - Technology Integration (TTP #014101)

Under this task, workshops will be organized and conducted to identify industrial technology needs through information exchange meetings across the DOE system for groundwater and soils cleanup, waste retrieval and processing, and waste minimization.

In FY92, the Technology Investment Strategy Workshop was conducted. Additional workshops have not been scheduled or planned for FY93.

Mixed Waste Integrated Program Support (TTP #121201)

This task provides for Rocky Flats technical support to DOE's Mixed Waste Integrated Program on proposed integrated demonstrations involving waste retrieval and processing, RCRA compliance, buried waste, hazardous waste, and combustible waste. In FY93, funding has been provided for Rocky Flats support of the supercritical water oxidation project being directed by the Idaho National Engineering Laboratory.

Technical Program Management Detailee (TTP #025001)

The objective of this project is to provide technical program management support to the Technical Program Officer and the DOE Office of Technology Development. The Technical Program Management Detailee provides a single point of contact for issue resolution with the Technical Program Officer, management, planning, and implementation of field activities, including efforts to link Rocky Flats' needs and development efforts with other DOE facilities' capabilities and similar problems.

The following activities were accomplished in FY92:

- Provided program management support
- Provided status reporting
- Prepared Research, Demonstration, Development, Testing, and Evaluation (RDDT&E) briefings
- Participated in technical program management meetings and working groups

In the future, the Detailee will provide ongoing program management support.

Integrated Demonstration Support (Rocky Flats Plutonium in Soils Cleanup [TTP #121101])

This project is a part of the overall plutonium-contaminated soil cleanup integrated demonstration at Nevada Test Site. The objective of this project, a two-year effort scheduled for completion by the end of FY93, is development and testing of an optimized cleanup system for large surface plutonium contamination. The overall project will primarily address areas of vegetation and soil removal, volume reduction of displaced vegetation and soil, and site restoration, including stabilization and revegetation. Studies will also be conducted on transportation alternatives, disposal options, and radiation detection systems to monitor, guide, and document the cleanup effort.

The current effort is primarily directed at addressing potential cleanup at the Nevada Test Site and adjacent Tonopah Test Range, which were contaminated during the 1950s and 1960s as a result of nuclear testing.

The Rocky Flats' portion of this project is to provide representative soil samples from OU 2 to Nevada Test Site for testing and to provide technical assistance during the processing of these samples. Information gained during this process will be incorporated into future options for remediation of contaminated soils at Rocky Flats.

Soil samples were shipped in FY92. The following activities are planned for FY93:

- Provide technical support to Nevada Test Site during sample processing
- Report on Rocky Flats test results

No further activities are currently planned beyond FY93 for this project.

Robotics Waste Minimization (TTP #113201)

The primary focus of this activity is to participate in the Weapons Complex Robotics Working Groups to ensure that development of automated systems will coincide with plant needs. After appropriate automation projects and technologies are identified for the site, the Technology Development group will serve as the liaison between Rocky Flats users and outside organizations involved with development of the automated systems. Other site-specific evaluations, demonstrations, and system implementations will be included in the outyear efforts.

6.4 TECHNOLOGY DEVELOPMENT - ADMINISTRATION AND PLANNING

The primary objective of this group of activities is to provide administrative and planning support to Technology Development.

Program Direction (TTP #026001)

This activity provides DOE oversight and management of technology development projects to ensure coordination with other DOE facilities within the Weapons Complex. One of the primary objectives of DOE personnel is coordination and timely development of technologies required by the FFCA II for LDR waste. DOE personnel also direct DOE planning activities and monitor M&O contractor performance.

Technology Investment Strategy (TTP #121205)

The Technology Investment Strategy (TIS) is a management tool for technology development activities, priorities, and efforts. It is a systems analysis mechanism for deciding which projects to pursue or abandon and what criteria to use in making those determinations. The TIS methodology began with a prioritization of Rocky Flats' waste and environmental needs. Following this ranking, a systematic methodology was implemented for fulfilling needs identified as having the highest priority. Solutions for consideration include administrative changes, implementing waste minimization technologies, implementing waste treatment technologies, and developing additional waste characterization and analysis capabilities.

The following activities were accomplished in FY92:

- Provided TIS support for DOE planning documents (e.g., Site-Specific Plan, Five-Year Plan, Roadmap)
- Developed ongoing system of technology integration

The TIS will be updated as needed in FY93.

Technical Program Support (TTP #12102)

In FY92, this task provided the necessary staff to produce documents without which technology development activities cannot be conducted at Rocky Flats. These documents

are mandated by the FFCA II for LDR waste and plant management procedures and policy. The purpose of providing specifically trained and dedicated staff for these documents is twofold: (1) to produce worthwhile, high-quality planning, permitting, safety, and procedural documents and (2) to avoid the diversion of technologists' time and energy from their specific development projects.

The following activities were accomplished in FY92:

- Completed first draft of Technology Development Conduct of Operations Manual
- Completed development and implementation of a chemical inventory data base
- Completed development and implementation of the Technology Development safety program

The following activities are planned for FY93:

- Complete schedules of all Technology Development projects
- Develop operating and administrative procedures for Technology Development
- Complete Technology Development Quality Plan

In FY93 and beyond, the administrative support for each project will be funded under the project TTP.

Science Education Outreach (TTP #104201)

Rocky Flats has developed academic programs to support plantwide technical needs, working with local universities/colleges to develop and deliver curricula in emerging environmental restoration and waste management technologies. These curricula are offered at levels ranging from associate's degrees to master's degrees. Health physics and environmental science programs have been defined and implemented. Waste management program development is currently in progress.

Colorado Center for Environmental Management (TTPs 114101, 114102, 114103)

The Colorado Center for Environmental Management has been formed to provide strategic direction to and collaborative programs for the public and private sectors to explore research and development, education, and business development in improving Colorado's environment and stimulating economic opportunity.

The Center will provide a focal point for hazardous waste cleanup issues with the following objectives:

- Help promote efficient use of limited funds and focus resources
- Identify cleanup needs and goals
- Stimulate innovation
- Develop pilot projects
- Stimulate interaction

The Center presently consists of representatives from numerous colleges and universities, private industry, and state and federal agencies.

6.5 OTHER TECHNOLOGIES

Technologies included in this section are not required by the FFCA II for LDR waste and include those to support TRU waste transportation and waste minimization goals.

Drum Counter Improvements/Upgrade

Improved accuracy and documentation of assay measurements are needed to meet Nuclear Regulatory Commission standards for TRU waste shipments in the TRUPACT-II. The objective of this task is to develop improvements necessary to eliminate assay bias and to quantify measurement uncertainties associated with the assay of drums on passive/active neutron and segmented gamma-ray systems counters. These systems are used to measure fissile material in 55-gallon and smaller drums used for waste storage at Rocky Flats.

Gas Generation Test

The objective of this test is to measure hydrogen gas generation by certain waste to be shipped in TRUPACT-II to ensure less than 5 percent buildup as mandated by the Nuclear Regulatory Commission. The primary task is hydrogen gas generation testing of specific waste forms generated at Rocky Flats.

Sort at Source

The objective of this task is to develop real-time state-of-the-art counting systems for segregating low-level waste from TRU waste at the point of waste generation. Specific goals include (1) demonstration of the feasibility of sorting low-level waste from TRU waste, (2) development of active and passive counters, (3) installation of counters in process areas, and (4) estimation of the fraction of waste that can be eliminated as TRU and immediately classified as low-level waste.

7.0 QUALITY ASSURANCE

7.1 DEFINITION

Quality assurance (QA) consists of planned and systematic actions necessary to provide adequate confidence that (1) structures, systems, processes, and equipment will perform satisfactorily; (2) activities are being performed in accordance with prescribed requirements; and (3) the resultant product meets defined specifications. QA at Rocky Flats is a shared responsibility of DOE-RFO and EG&G, Rocky Flats, Inc. DOE-RFO provides QA guidance and assistance to EG&G and reviews results and operating systems to determine whether defined requirements are being met. DOE-RFO and EG&G QA organizations are discussed below.

7.2 DOE-RFO QUALITY ASSURANCE ACTIVITIES

The Quality Assurance Division of DOE-RFO is the responsibility of the Assistant Manager for Technical Support. The mission of the Quality Assurance Division is to assist in the establishment, execution, and assurance of an effective, comprehensive and integrated QA program for DOE-RFO and the M&O contractor. Several functions conducted by this division that affect site environmental and waste management activities are outlined below.

The Quality Assurance Division interprets pertinent QA requirements imposed by external organizations and determines how these requirements apply to Rocky Flats. These requirements include guidelines set forth in:

- Federal, state, and local laws
- DOE objectives, policies, directives, and procedures
- Regulations and other requirements of federal agencies such as NRC or EPA

The Quality Assurance Division establishes sitewide performance goals and standards to govern QA activities and is responsible for implementing standards through the Rocky Flats Plant Quality Assurance Program. This function includes (1) communicating all QA requirements, goals, and standards to the M&O contractor; (2) assisting the M&O contractor with review of procedures, policies, plans, and technical documentation for QA objectives; (3) identifying M&O contractor QA deficiencies; and (4) helping the M&O contractor resolve program deficiencies. Compliance audits, reviews, and corrective activity tracking are also performed. Audits include periodic appraisals of the M&O contractor's QA program.

Other functions under this division include technical document review and day-to-day coordination of plant quality efforts.

7.3 EG&G QUALITY ASSURANCE ACTIVITIES

The EG&G Rocky Flats Quality Assurance Program is established in the Rocky Flats Quality Assurance Manual, which incorporates the requirements of the DOE Quality Assurance Program. The DOE Quality Assurance Program is based on the requirements

of DOE Order 5700.6B (Quality Assurance), DOE-RFO Standard Operating Procedure 5700.6B (Quality Assurance), DOE-RFO Quality Assurance Requirements for Rocky Flats Management and Operations, Quality Assurance Program Requirements for Nuclear Facilities (NQA-1) Basic Requirements and Supplements, and DOE Albuquerque Field Office Quality Criteria.

7.3.1 Policy

It is the policy of EG&G to implement and maintain an auditable and cost-effective QA program, founded on the principles of continual improvement, to ensure the required level of quality throughout all areas and to guarantee continued performance. The Rocky Flats Plant Quality Assurance Program applies to all projects, programs, and activities managed and conducted by EG&G at Rocky Flats. It is designed to ensure compliance with applicable requirements of government agencies, customers, and EG&G and to strive for continuing quality improvements in all operations.

7.3.2 Responsibilities

Rocky Flats QA Program responsibilities are briefly described as follows:

- The EG&G Rocky Flats General Manager is responsible for ensuring that a QA program is implemented and maintained.
- The Assistant General Manager of Quality Assurance coordinates development, implementation, and maintenance of the Rocky Flats Plant Quality Assurance Program; provides guidance in the specific application of QA requirements; reviews and approves QA implementing procedures and plans; interfaces with DOE-RFO on QA issues; and provides independent verification and certification where necessary.

Each plant Assistant General Manager or Associate General Manager is responsible for establishing adequate and effective procedures that comply with applicable Rocky Flats Plant QA Program requirements.

7.3.3 Documentation

The Rocky Flats Plant QA Manual provides the basis for implementation of QA requirements. The requirements of the Rocky Flats Plant QA Manual are implemented through development of QA plans. Rocky Flats organizations implementing the requirements of the Rocky Flats QA Manual are responsible for addressing and specifying which QA requirements, or portions thereof, apply to specific activities, items, and services. QA plans and associated implementing procedures are established with primary emphasis on achieving a high degree of quality and operational success and additional emphasis on safety, health, environmental protection, performance, security, safeguards, and other legal and contractual obligations.

After the overall project requirements are defined, the program manager and a Rocky Flats QA representative conduct and document an assessment of the program or project to apply

the appropriate level of quality control and verification required to guide an activity. A QA plan is developed as early as possible in the development of a program, project, or activity and identifies the basic elements of applicable Rocky Flats Plant Quality Assurance Program requirements. The QA plan includes:

- Evaluation of the activity to determine necessary management controls
- Information regarding organization, responsibilities, procedures, and QA records
- Evaluation of the activity against the basic elements and supplements of the Rocky Flats Plant Quality Assurance Program requirements
- Identification of implementation procedures necessary to satisfy the requirements specific to each activity
- Identification of operating procedures and other management controls used to implement and control a given element

The completed QA plan provides documentation of the program or function's ability to satisfy requirements specified in the Rocky Flats QA Manual and Rocky Flats Operational Safety Requirements.

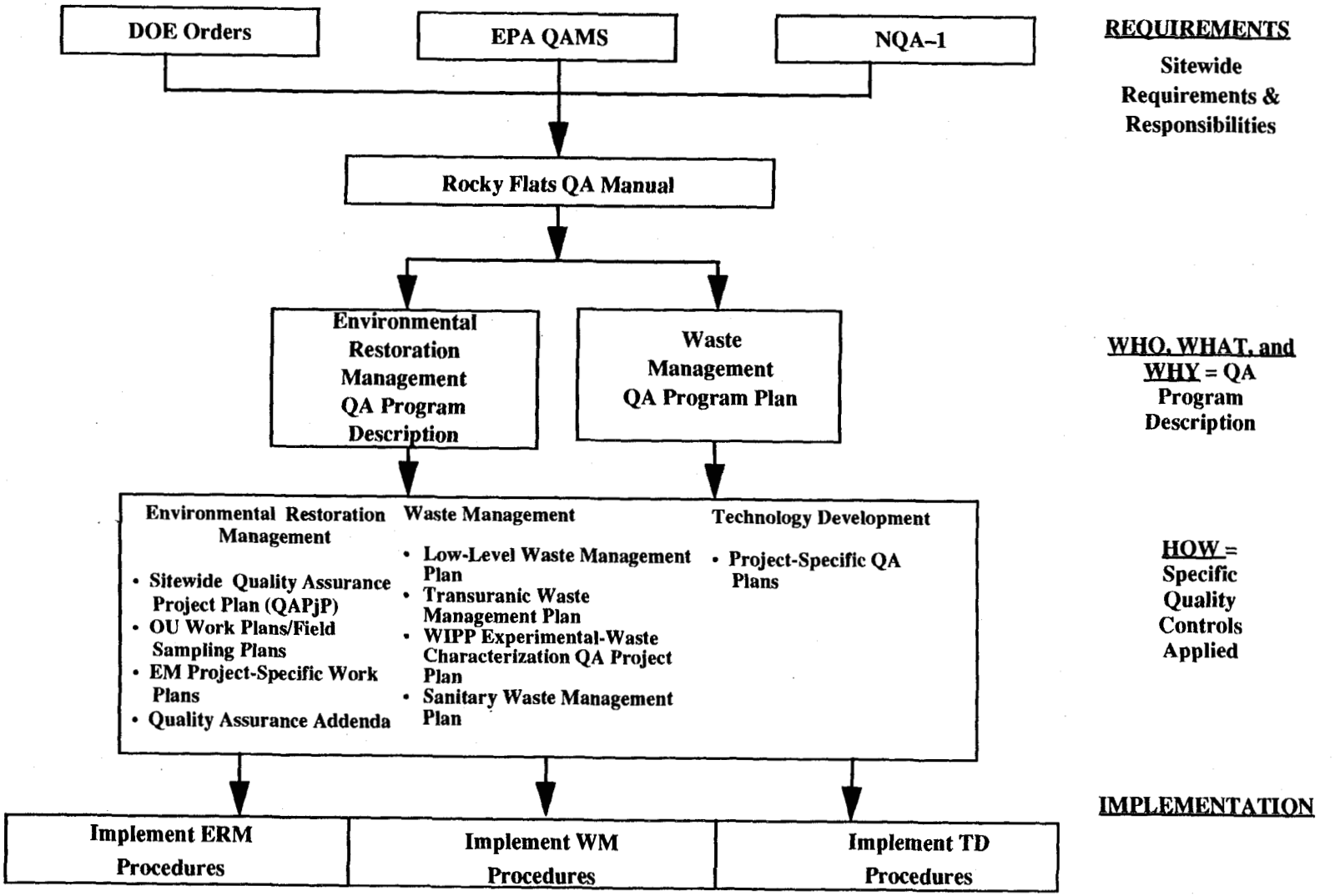
7.3.4 Environmental Restoration Management/Environmental and Waste Management Quality Assurance

The EG&G ERM and E&WM organizations at Rocky Flats have incorporated or are implementing applicable QA requirements throughout the organizations. In addition to plant QA requirements, EPA QA requirements and DOE orders pertaining to QA are applicable to certain activities conducted by these organizations. The EPA requirements are incorporated into the ERM and E&WM QA programs based on guidance included in EPA QAMS/005/80, Interim Guidelines and Specifications for Quality Assurance Project Plans, and the guidance documents referenced in the IAG. DOE Order 5400.1 establishes environmental protection requirements for DOE operations and requires that a QA program be established for environmental programs, consistent with DOE Order 5700.6B. This order sets forth requirements for establishing, implementing, and maintaining plans and actions to ensure quality achievement in DOE programs.

Documentation of ERM and E&WM quality plans and procedures is illustrated in Figure 22. As shown, these QA plans address sitewide responsibilities and requirements applicable to ERM and E&WM organizations. The Waste Program Plans division is responsible for providing QA leadership and expertise for Waste Programs and Waste Operations, and the ERM and Technology Development organizations are developing separate QA programs. All departmental QA programs interact to ensure consistency among programs.

7.3.4.1 Environmental Restoration Management

The ERM organization is responsible for planning, implementing, and reporting on environmental restoration activities at Rocky Flats. These ERM organization functions are performed in compliance with the quality requirements identified in the EM-20 Quality Assurance Requirements Document (QARD), DOE Order 5400.1, and EPA QAMS/005/80.



Environmental Restoration Management/Environmental & Waste Management Quality Program
Proposed Document Hierarchy
Figure 22

The ERM organization has developed a Quality Assurance Program Description (QAPD) that identifies requirements, describes methods, and assigns responsibilities for achieving and ensuring quality. The ERM QAPD applies QA requirements to items and activities that have the potential to impact:

- Health and safety of the public and Rocky Flats personnel
- Environment
- Compliance with federal, state, local, and Rocky Flats environmental regulations, permits, orders, and agreements
- Other areas specifically designated by the ERM Department Director

The quality requirements identified in the ERM QAPD are met through development and implementation of program, project, or activity-specific work plans and administrative and operating procedures. ERM QA program requirements are incorporated into ERM work activities through the preparation of work plans that describe the work activities to be implemented. Administrative and operating procedures are established to provide controls for the implementation of activities consistent with public and worker health and safety, environmental protection, and product quality objectives.

Quality requirements that are incorporated into project-specific work plans include:

- Identification of applicable codes, standards, and regulations
- Identification and descriptions of project-specific organizations, responsibilities, and interfaces
- Description of work, scope, and objectives
- Identification of applicable quality performance requirements
- Reference to, or inclusion of, sampling procedures and analytical methods
- Identification of activities requiring verification by qualified inspection and test personnel
- Identification of data quality objectives and/or data acceptance criteria
- Identification of data validation, reduction, reporting, and assessment requirements
- Identification and descriptions of equipment, materials, and instrumentation or reference to operating procedures that describe equipment, materials, and instrumentation to be used
- Identification of calibration and maintenance requirements for field and laboratory measuring and test equipment used to generate measurement data
- Identification of QA records to be generated from implementation of the activities covered by the work plan

Responsibilities

The organizational structure, functional responsibilities, levels of authority, and lines of communication of the ERM organization are described in Section 1.0 of the ERM QAPD. An ERM QA Program Manager (QAPM) has been selected and reports directly to the

ERM Associate General Manager. The QAPM is independent of the activities being performed by the divisions. Each division manager has selected a quality coordinator responsible for coordinating QA activities within their respective divisions and for providing guidance to other personnel in meeting QA program requirements. Organizational responsibilities are briefly summarized as follows:

- The ERM Associate General Manager is responsible for overall departmental activities, including establishment and implementation of the ERM QA program. The director ensures the development of procedures and internal verification of QA program implementation through surveillance, oversight, inspections, and management assessment.

- The ERM QAPM provides guidance and consultation for developing, implementing, and maintaining the QA program, including providing direct assistance with implementation as necessary. The QAPM interfaces directly with the EG&G QA organization regarding development and approval of the ERM QA program and verification of compliance with QA requirements.

- ERM division managers are responsible for development and approval of division-level plans, procedures, and instructions and ensure that division personnel are adequately trained and qualified to perform assigned tasks. Division managers are also responsible for ensuring that oversight inspections for work activities within their division are scheduled and performed.

- ERM quality coordinators are responsible for coordinating QA program activities within their respective divisions and for providing guidance to other personnel in meeting program requirements. Quality coordinators schedule and coordinate oversight inspections for division activities.

- ERM project managers are responsible for developing and gaining approval for project work plans and for coordinating implementation of all work activities addressed by work plans. They are responsible for ensuring that operational procedures and instructions are developed and approved for all project activities.

- Department personnel are responsible for incorporating quality into work activities, reporting conditions adverse to quality, and recommending quality improvements.

- The EG&G Rocky Flats quality organization, Site Quality Assurance, is responsible for reviewing Level 1 procedures, QA plans, and ERM administrative procedures. QA compliance audits and surveillance are performed by the Standards, Audits, and Assurance organization.

IAG Quality Assurance Documentation

In addition to the ERM QAPD, the sitewide quality assurance project plan (QAPjP) has been developed to identify and address the quality requirements that apply to environmental

restoration program activities required by the IAG. This IAG milestone document identifies the QA requirements and specific measures for implementing these requirements. These QA requirements are applicable to field sampling plans, remedial investigations, treatability studies, and interim and final remedial actions, which are performed as part of the Environmental Restoration program at Rocky Flats.

The sitewide QAPjP addresses the potential for environmental releases, potential regulatory concerns, DOE orders, environmental laws, EPA guidance, and public awareness. QA requirements described in the sitewide QAPjP are implemented by DOE, EG&G, and all subcontractors conducting environmental response activities at Rocky Flats. The plan describes the policy, organization, functional responsibilities, and QA requirements and methods necessary to ensure that data quality objectives are met.

The QA requirements set forth in the sitewide QAPjP are consistent with requirements set forth in the ERM QA Program Description Document. The QA requirements and QA document/sampling plan hierarchy for the Environmental Restoration program are shown in Figure 23. The sitewide QAPjP and applicable sitewide standard operating procedures constitute the IAG-required Sampling and Analysis Plan for environmental restoration activities.

OU managers and project managers are responsible for ensuring that applicable standard operating procedures addenda are implemented during the conduct of field activities. Each OU work plan/field sampling plan is also accompanied by a QA addendum that outlines the measures taken to meet QA requirements.

7.3.4.2 Waste Management

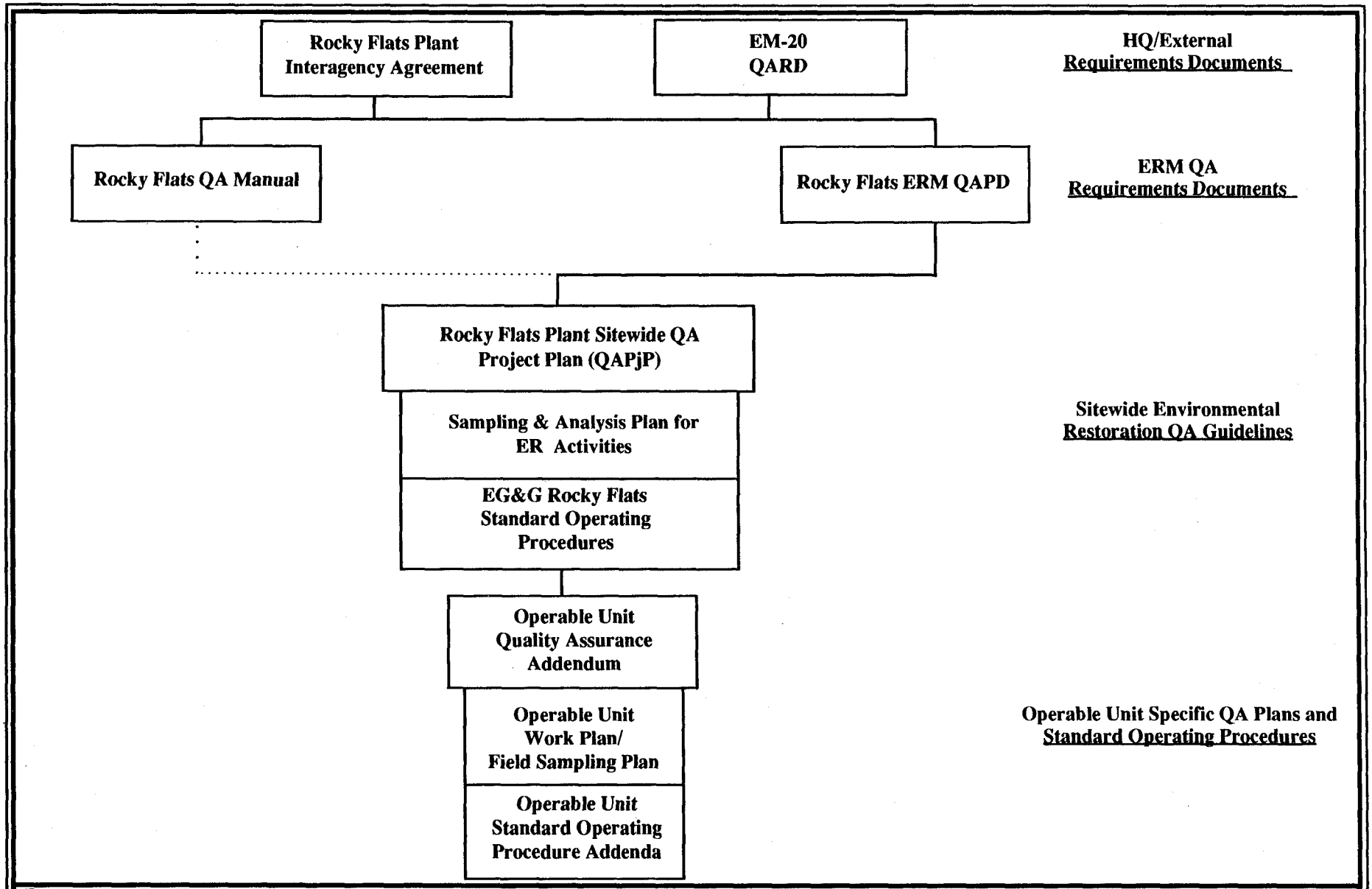
Waste management functions at Rocky Flats are performed in compliance with the quality requirements defined in DOE Order 5700.6B. DOE requirements are implemented for Rocky Flats through the Rocky Flats QA Manual, which is maintained by the Site Quality Assurance organization.

Documentation

The QA program being implemented to comply with the Rocky Flats QA Manual and DOE orders is documented in the Waste Management Quality Assurance Program Plan (WM QAPP). The WM QAPP and waste-specific management plans are required for certification of wastes for offsite shipment. Waste-specific plans include the following:

- Low-Level Waste Management Plan
- Transuranic Waste Management Plan
- WIPP Experimental-Waste Characterization QA Project Plan
- Sanitary Waste Management Plan

The Low-Level and TRU Waste Management Plans address sitewide programs and present the controls necessary to produce a waste form acceptable for offsite disposal. Specific processes have controls described in process control plans (e.g., Supercompactor Process



QA Requirements and Document Hierarchy for the Rocky Flats Plant Environmental Restoration Program

Figure 23

Control Plan and the Sewage Sludge Process Control Plan). A Sanitary Waste Management Plan is in development, and a revision of the WM QAPP to include requirements for hazardous waste and waste characterization is scheduled for completion by October 1992.

Responsibilities

The Site Quality Assurance organization is responsible for the sitewide QA program and for independent oversight of the Waste Management QA program. These responsibilities include inspection and certification of wastes, surveillance of processes and systems to ensure compliance with QA requirements, and identification of deficiencies where nonconformances are found.

The Waste Quality Management group within the Waste Programs organization is responsible for developing and documenting the Waste Management QA program. This includes working with operations management to identify and implement the controls necessary to meet QA requirements and maintaining the QA documents after development.

All operations managers at Rocky Flats are responsible for managing their operations in accordance with the Waste Management QAPP and the Rocky Flats QA Manual.

7.3.4.3 Technology Development

The Technology Development organization (TD) is establishing a QA program to ensure compliance with applicable QA policy.

Documentation

TD is presently developing a comprehensive QA strategy that will be used by TD personnel (on a project-specific basis) to provide guidance for incorporating QA procedures into project work. It will establish QA requirements and responsibilities for TD personnel and outline procedures for implementation of QA requirements and policy.

Requirements/Responsibilities

The TD QA strategy will identify the QA elements required in the project-specific QA plans. Project activities conducted within TD proceed through several phases in the course of project development, and each phase of project development will incorporate QA policy requirements. Project-specific data quality objectives will be developed during the early stages of project planning.

For a given project, qualitative and quantitative project-specific data quality objectives, the project scope, and the project description will be discussed in the initial project development plan. The project description defines the project's QA objectives in terms of the project requirements. The project methods of sampling, sample preparation, and analysis will be selected in order to meet the project's QA objectives. The QA objectives will establish the minimum quality level of data required to draw valid conclusions regarding the objectives of the test program and to support specific decisions or regulatory actions.

The initial project development plan will also identify the key QA/QC personnel associated with the project and specify the procedures for project communication, including procedures for monitoring subcontractors.

The experimental phase will require an experimental QA project plan, which must address applicable QA needs, including responsibilities, data quality objectives, performance verification, and internal and external requirements. Upon completion of the experimental phase, which includes laboratory- and/or bench-scale testing and the subsequent experimental results report, the project may enter the pilot-scale test demonstration phase, where a demonstration QA project plan may be required.

The pilot-scale test demonstration QA project plan will probably be similar to the experimental QA project plan, but it will be more detailed because of the increased level of overall project requirements at this stage. The plan may include the use of checklists to ensure project readiness for start-up, a schedule of all planned performance evaluations and regulatory audits, the personnel responsible for such audits, and a schedule of any inter-laboratory performance evaluation studies.

Full-scale design and construction is the final phase that a project may enter. As in other phases, the applicable QA requirements will be incorporated into the project. Full-scale project QA project plan approval is required prior to construction.

8.0 AGREEMENTS

One of the goals for Rocky Flats is compliance with all applicable environmental regulations and conditions set by permits and agreements. Many of the activities in the SSP are specifically needed to achieve compliance with permit requirements and agreement terms. The agreements that affect activities at Rocky Flats are summarized below.

8.1 AGREEMENT IN PRINCIPLE (AIP)

DOE and CDH entered into the AIP on June 28, 1989. In this agreement, DOE committed to an expanded environmental monitoring program at Rocky Flats, an acceleration of cleanup activities at some contaminated sites, several initiatives for achieving a more comprehensive environmental management system at Rocky Flats, and allocation of additional funds to the State of Colorado to administer Rocky Flats oversight programs. Full implementation of activities initiated under the AIP is an ongoing effort.

8.2 FFCA II FOR LDR WASTE

DOE and EPA signed the FFCA II for LDR waste on May 10, 1991. The agreement pertains to mixed and hazardous waste at Rocky Flats and outlines the steps that must be taken to reach compliance with RCRA Land Disposal Restrictions. This agreement supersedes the FFCA I for LDR waste and is in effect for two years.

8.2.1 Agreement History

The FFCA I for LDR waste was signed by DOE, EPA, and CDH on September 19, 1989, and outlined steps to be taken to reach compliance with RCRA Land Disposal Restrictions. At Rocky Flats, compliance had to be reached in the areas of storage, treatment, and waste minimization.

With regard to storage, the agreement required a series of reports that identified wastes stored at Rocky Flats, their locations, and their generation rates. Characterization of waste streams was also performed.

Requirements in the treatment area included two treatment reports and plans which identified treatment and disposal technologies needed to manage LDR mixed wastes and assessed the availability of existing treatment technologies and alternative technologies under development.

The agreement also set forth several waste minimization requirements, including a waste minimization program plan and a waste reduction report. Both of these documents are updated annually and document plans and accomplishments of the Rocky Flats waste minimization program.

Although Rocky Flats met the requirements of the FFCA I for LDR waste, ongoing work was necessary to reach compliance with RCRA Land Disposal Restrictions, primarily in the area of treatment. This work has continued under the FFCA II for LDR waste.

8.2.2 Current Agreement

The FFCA II for LDR waste, which was signed by DOE and EPA on May 10, 1991, requires development of a Comprehensive Treatment and Management Plan (CTMP), which outlines a strategy and schedule for evaluating promising technologies and recommending treatment methods for LDR waste (see Section 6.2).

The major requirements of the agreement and their due dates are as follows:

- The CTMP was submitted June 10, 1992.
- The Annual Waste Minimization Program Plan was submitted September 10, 1991, and will be updated in September 1992.
- The Annual LDR Progress Report was submitted March 31, 1992, and will be updated in March 1993.
- The Residue Management Report will be submitted by November 10, 1992.
- Nonradioactive Hazardous Waste Shipping Schedule was submitted January 10, 1992
- Updated WSRIC report will be submitted by September 10, 1992

Negotiations began in June 1992 for a new agreement (FFCA III) to include the State of Colorado. This agreement is expected to grant full LDR waste program authority to CDH by late 1992.

8.3 COMPLIANCE ORDERS FOR RESIDUES

The Settlement Agreement and Compliance Order on Consent 89-10-30-01, commonly referred to as the RCA, documents the understanding between DOE and CDH regarding alleged violations of 6 CCR 1007-3 of the Colorado hazardous waste regulations that resulted from storage of mixed residues. The overall intent of the RCA was to (1) identify residues contaminated with hazardous constituents and/or possessing hazardous characteristics that may be subject to RCRA regulation and (2) set forth the activities necessary to bring treatment and storage of such residues into compliance with RCRA regulations.

Requirements under the RCA included (1) classification of residues by waste form, (2) formulation of a characterization plan for residues, and (3) generation of a plan and schedules (the Mixed Residue Compliance Plan, dated September 1990) for bringing mixed residue management into compliance with Colorado hazardous waste regulations.

Compliance Order 91-07-31-01, commonly referred to as the Residue Compliance Order (RCO), was issued by CDH on July 31, 1991, to address management of plutonium-bearing mixed residues in accordance with Colorado hazardous waste regulations. In the RCO, CDH commented on, revised, and added to the requirements and schedules identified in the Mixed Residue Compliance Plan. The schedules given in the RCO supersede the schedules identified in the Mixed Residue Compliance Plan.

Compliance with the RCO includes the following requirements:

- Ninety-day and satellite accumulation areas for mixed residues compliance with Part 262.34 of the Colorado hazardous waste regulations by August 30, 1991
- Mixed residue container storage areas compliance with operating record requirements by August 30, 1991
- Recordkeeping and reporting in place by August 30, 1991
- Submittal to CDH of a standardized closure plan for mixed residue storage areas (including a description of mixed residue areas closure) by September 29, 1991
- Implementation of general operating requirements, inspections, and spill response requirements of Colorado hazardous waste regulations for tanks and treatment units identified as RCRA regulated in the Preliminary Mixed Residue Tank and Treatment Unit Report (dated June 28, 1991) by September 29, 1991
- Submittal to CDH of (1) a report that identifies all RCRA tanks requiring alternative inspection procedures because of potential radiation exposure and (2) an inspection implementation plan by September 29, 1991
- Submittal to CDH by September 29, 1991, of a protocol that describes the method for determining whether mixed residue recycling processes are exempt from hazardous waste permitting requirements
- Preparation and submittal to CDH of a waste analysis plan for mixed residue container storage areas, including sampling and analytical methods, frequency of sampling, and quality assurance/quality control procedures by October 29, 1991 (the plan must be revised to cover mixed residue tanks and treatment units after the tank and treatment unit list is approved by CDH)
- Completion of initial RCRA training for generators and handlers of mixed residues by October 29, 1991
- Submittal of a report to CDH by October 29, 1991, detailing the status of mixed residue waste minimization efforts at Rocky Flats and including a schedule for implementing the mixed residue waste minimization program
- Modification of the site contingency plan to include mixed residues by November 28, 1991
- Compliance of all mixed residue storage areas with requirements of Colorado hazardous waste regulations by November 28, 1991
- Full compliance of RCRA-regulated tanks and treatment units identified in the Preliminary Tank and Treatment Unit Report with Part 265 of Colorado hazardous waste regulations by November 28, 1991
- Submittal of a report to CDH by February 28, 1992, describing the Rocky Flats mixed residue inventory reduction program and including a schedule for implementation
- Completion of hazardous waste determinations for backlog residues by March 31, 1992 (hazardous waste determinations for newly generated residues must be made at the time residues are removed from the process that generated them)
- Submittal to CDH by March 31, 1992, of a schedule for completion of residue characterization studies for residues that cannot be analyzed using EPA-approved methods (the schedule must include time frames for developing alternative analytical techniques and submittal of petitions for use of equivalent test procedures)

- Submittal to CDH of closure plans within six months of CDH approval of the Preliminary Mixed Residue Tank and Treatment Unit Report for storage and treatment units that are not intended to receive operating permits
- Submittal to CDH of Part A and Part B RCRA permit modifications for mixed residue tank and treatment units that require operating permits within six months of CDH approval of the Preliminary Mixed Residue Tank and Treatment Unit Report
- Full compliance of mixed residue tanks not identified in Table 1 of the Preliminary Mixed Residue Tank and Treatment Unit Report with the requirements of Part 265 of Colorado hazardous waste regulations within 120 days of CDH approval of the report
- Suspension of use of tank and container storage units with no inventory on the effective date of the RCO for storage of mixed residues until they receive a permit or are expressly approved by CDH (treatment units may not be operated without a permit or express written approval from CDH)
- Implementation of the incinerator closure plan upon CDH approval of the plan
- Removal of all mixed residues from Rocky Flats by January 1, 1999, unless other arrangements have been authorized by CDH
- Submittal to CDH of procedures for shipping mixed residues at least 30 days prior to the first offsite shipment

Since the date of the original RCO, Rocky Flats has entered into negotiations with CDH regarding RCRA compliance activities for mixed residues. Rocky Flats is working with CDH to ensure compliance with a 1991 court order (which resulted from the second Sierra Club Legal Defense Fund suit) stating that the plant must obtain a RCRA permit for mixed residues by August 13, 1993. As a consequence, mixed residue compliance activities have focused on preparing a permit modification, which was submitted to CDH on June 30, 1992. In addition, Rocky Flats submitted a Tank Management Plan to CDH on March 28, 1992. Ongoing compliance activities include conducting in-house compliance surveys, initiating work orders for secondary containment upgrades, and preparing closure plans for residue tank units that are not included in the permit modification. Negotiations continue on an amended RCO to be incorporated with a federal consent decree to settle a residue lawsuit brought by CDH against DOE on August 1, 1991.

8.4 INTERAGENCY AGREEMENT (IAG)

The IAG for environmental restoration activities at Rocky Flats was signed on January 22, 1991, by DOE, EPA, and CDH. Officially titled as a Federal Facility Agreement and Compliance Order, the agreement clarifies responsibilities and authorities of the three agencies, describes the procedures to be followed, and sets time lines for completion of various activities for study and cleanup of past contamination at Rocky Flats. The agreement outlines each agency's role in, and integrates the authority/jurisdiction of RCRA and CERCLA over the study and cleanup process. It also provides mechanisms for resolving issues that may arise among the participants during cleanup activities. The IAG and FYP are the principal documents guiding cleanup efforts at Rocky Flats.

The draft IAG was issued for public comment in December 1989 and was then submitted for official approval in August 1990, with changes reflecting comments received from the

public. The final IAG is substantially the same as the draft IAG. The most visible modifications were the reprioritization of the Rocky Flats operable units and changes in the milestone schedules for the operable units. The most significant change was in response to public comments requesting higher priority for offsite soil and reservoir contamination areas. These offsite areas are now designated as OU 3 instead of OU 10.

The operable unit reprioritization necessitated adjustments in the time lines associated with the operable units to reflect more realistic schedules for completion of the various studies required. The IAG requires that DOE notify the public of any schedule changes to those set forth in the final IAG. The final IAG also stipulates that various additional measures be taken for improved public involvement and directs DOE to address these public involvement commitments in the Community Relations Plan.

The specific purposes of the IAG are to:

- Identify IRAs/ICMs, if any, that are appropriate at Rocky Flats sites prior to implementation of final remedial actions for the sites
- Establish requirements for performing an RI/RFI and for performing an FS/CMS for each operable unit at Rocky Flats in accordance with CERCLA, RCRA, and the Colorado Hazardous Waste Act
- Identify the nature, objective, and schedule of response actions to be taken at Rocky Flats
- Ensure compliance with federal and state hazardous waste laws and regulations for matters covered by the IAG

The numerous milestones stipulated by the IAG are available in the IAG document at the DOE information repositories listed in Appendix C.

8.5 NPDES FEDERAL FACILITIES COMPLIANCE AGREEMENT (NPDES FFCA)

The NPDES FFCA was signed March 25, 1991, by DOE and EPA Region VIII. The FFCA incorporated changes to NPDES monitoring requirements and required submittal of three compliance plans that address administrative and physical changes to the plant.

Revisions to NPDES monitoring requirements include changing one "point of compliance" location from pond B-3 to the Sewage Treatment Plant (STP) discharge for most parameters. Monitoring requirements for total chromium and whole effluent toxicity at the terminal ponds and monitoring for metals, volatile organic compounds, and whole effluent toxicity at the STP discharge were also added.

Three compliance plans were submitted in accordance with the agreement: the Groundwater Monitoring Plan for the STP Sludge Drying Beds, the STP Compliance Plan, and the Chromic Acid Incident Plan and Implementation Schedule. The FFCA also requires submittal of quarterly progress reports to EPA to update the status and schedule of projects within each compliance plan. The contents of the three compliance plans are discussed below.

Groundwater Monitoring Plan for the STP Sludge Drying Beds

A draft groundwater monitoring plan was submitted to EPA in July 1990. The plan proposed a method for characterizing groundwater beneath the sludge drying beds located east of the STP. EPA subsequently recommended a phased approach beginning with monitoring and characterization of soil and water in the vadose zone (the layer between the water table and the earth's surface). The Vadose Zone Monitoring Plan was submitted to EPA and approved in June 1991. An addendum to the monitoring plan has been submitted for two additional sludge drying beds located east of Building 910. Fieldwork at both locations was initiated during 1992.

STP Compliance Plan

The STP Compliance Plan was submitted to EPA in July 1990. This plan described planned improvements to the STP necessary to meet NPDES water quality standards and FFCA criteria. These improvements are described in Section 5.4.4.

Chromic Acid Incident Plan and Implementation Schedule

A draft Chromic Acid Incident Plan was submitted to EPA in November 1990. The plan was prepared in response to recommendations made following a DOE investigation of an unplanned release in 1989 of chromic acid solution from Building 444. The plan addressed physical and administrative changes to reduce the possibility and impact of future spill events. A number of proposed actions have been completed, and EPA has agreed to refocus the remaining scope of the plan to emphasize issues relevant to surface water protection and source control. A final plan incorporating the revised approach was submitted to EPA during March 1992.

Activities included in the above-mentioned plans are expected to extend through FY95, and a new NPDES permit will be negotiated. Following completion of these activities and permit negotiations, Rocky Flats will be in compliance with NPDES requirements.

8.6 RADIONUCLIDE NESHAPS ADMINISTRATIVE COMPLIANCE ORDER

On March 3, 1992, EPA issued an administrative compliance order to EG&G, which outlined requirements that EG&G must meet for compliance with NESHAPs. The effective date of the order was March 15, 1992.

Requirements for emissions sampling, continuous emissions monitoring, and investigative projects were included in the order. These requirements are summarized as follows:

- Modify emission testing and radionuclide sampling procedures to be consistent with EPA-approved methods
- Modify continuous emissions monitoring systems to comply with EPA-approved procedures, or obtain EPA approval for alternative methods currently being used
- Complete the following four investigative projects
  - As-built duct drawing study

- Effluent velocity and characterization study
- Effluent particle size and composition study
- Isokinetic versus subisokinetic effluent sampling study

Rocky Flats is working toward compliance with the order and is negotiating the completion schedule to ensure compliance.

9.0 NATIONAL ENVIRONMENTAL POLICY ACT

NEPA is the nation's first comprehensive legislative and public policy statement on protection of the environment. Federal regulations issued by the Council on Environmental Quality require submittal of NEPA documentation for proposed major federal actions with potential for significant effects on the quality of the environment. Levels of NEPA documentation include categorical exclusions (CXs), environmental assessments (EAs), and environmental impact statements (EISs).

In February 1989, Rocky Flats established a NEPA Compliance Committee to provide integrated review, guidance, and oversight for plantwide activities. The NEPA Compliance Committee created the Rocky Flats Environmental Checklist. Use of the checklist is suggested for all proposed actions. The Environmental Checklist provides an initial screening and review of construction, engineering, and similar projects to determine whether submittal of an Action Description Memorandum is recommended or whether the action fits one of DOE's CXs. Action Description Memoranda are submitted to DOE for a determination of the level of NEPA documentation required (CX, EA, or EIS).

On April 24, 1992, DOE-HQ issued NEPA implementing procedures for the purpose of revising provisions of DOE's NEPA guidelines. The revisions were based on DOE's experience in implementation of NEPA guidelines and on the directives of Secretary of Energy Notice 15-90 to provide more specific information and detail in the guidelines and to enhance public review opportunities. DOE considered and evaluated the comments received during the public comment period for this revised rule. Many revisions suggested in these comments were incorporated into the final rule, which became effective May 26, 1992. A revised and expanded list of typical classes of actions requiring various levels of documentation is provided in appendices to this rule.

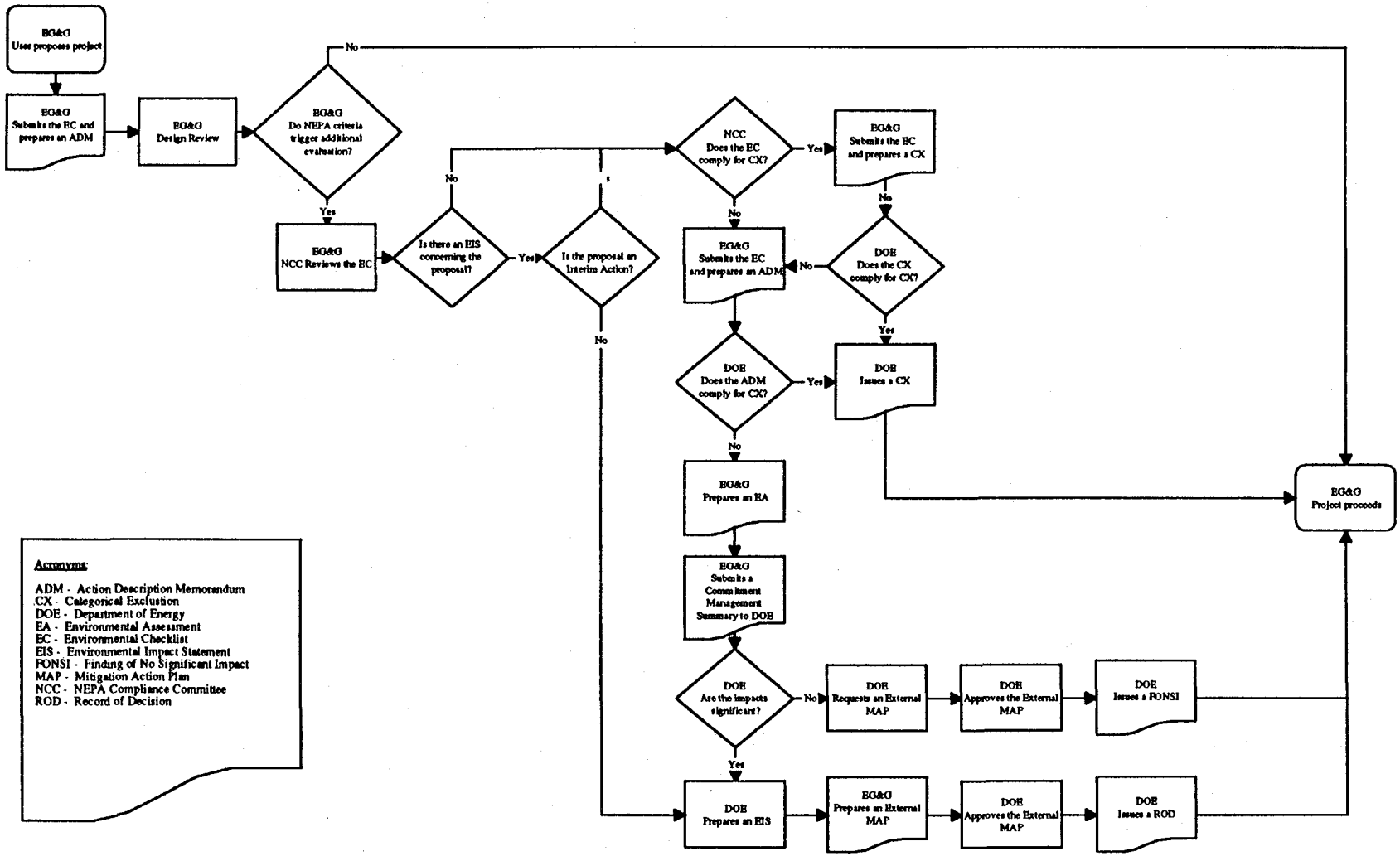
The levels of NEPA documentation (CX, EA, or EIS) are discussed in further detail below. A flow chart illustrating the NEPA determination process is provided in Figure 24.

9.1 CATEGORICAL EXCLUSIONS

Categorical Exclusions encompass actions that do not individually or cumulatively have a significant effect on the quality of the human environment. If a proposed action falls under a CX category, it is exempt from requirements to prepare an EA or an EIS. The CXs presently approved for DOE are listed in appendices of the revised rule. NEPA guidelines are periodically updated by DOE to include new CXs as they are approved.

Some of the key projects for which CXs were granted in FY92 include the following:

- Sitewide Treatability Study
- Plant site paving improvements
- Installation of sediment samplers and monitoring devices
- Geologic and ecological site characterization



National Environmental Policy Act
Documentation Determination Process
Figure 24

9.2 ENVIRONMENTAL ASSESSMENTS

An EA is prepared for most proposed actions that do not fit into any of the categories eligible for a CX. The analysis performed during an EA may lead to a Finding of No Significant Impact (FONSI), at which point no further NEPA documentation is required.

If the analysis performed during the EA indicates that a more detailed examination of potential environmental effects is necessary, an EIS is performed. If it is decided in advance that an EIS will be prepared for a proposed action, an EA is not required.

DOE is required to make FONSI statements available to the public for review and comment before NEPA documentation requirements are finalized. If the FONSI determination is based on additional activities to reduce the impacts of the proposed action, DOE must prepare a Mitigation Action Plan before the FONSI can be issued.

Some of the key projects for which EAs are currently being prepared include the following:

- Residue Drum Storage Facility
- New Sanitary Landfill
- Liquid Waste Treatment Facility Upgrades
- Herbicide Weed Control in the Remedy Acreage
- New Rifle Range
- Building 776 Upgrades

9.3 ENVIRONMENTAL IMPACT STATEMENTS

An EIS is a public document required for major federal actions that may significantly affect the environment. It is used as a decision-making tool and examines the positive and negative effects of the proposed action and its alternatives. EISs relating to Rocky Flats, which are currently in progress, are discussed below.

9.3.1 Rocky Flats Plant Sitewide Environmental Impact Statement

DOE published its intent to prepare a Sitewide EIS (SWEIS) on overall operations at Rocky Flats in the March 13, 1991, *Federal Register*. The SWEIS will identify and assess potential impacts and present a full evaluation of the cumulative environmental impacts of current operations and future actions, including proposed near-term environmental restoration activities at Rocky Flats.

This SWEIS is being prepared in response to findings from DOE's internal environmental compliance assessment (Tiger Team Audit), which indicated the need to update the existing 1980 Rocky Flats Plant EIS and to further the purpose of NEPA as defined in Secretary of Energy Watkins' memo dated February 5, 1990. The SWEIS will also lay the groundwork for the proposed environmental restoration EAs defined in the IAG.

Public scoping meetings for the SWEIS were held in April 1991. These sessions provided the public and other government agencies with an opportunity to express to DOE concerns

that should be addressed in the SWEIS. The scoping comments are being evaluated to determine the extent of analysis needed for specific topics, possible new sources of information, and ultimately the content of the SWEIS.

The following issues have been identified for analysis in the SWEIS, subject to consideration of comments received in response to public scoping:

- Water Resources and Water Quality - the qualitative and quantitative effects of Rocky Flats operations on water resources in the region
- Air Quality - radiological and nonradiological emissions to the atmosphere
- Public and Occupational Safety and Health - the cumulative radiological and nonradiological impacts on workers and the public from routine operations and potential accidents
- Biological Resources - the disturbance or destruction of habitat, including potential effects on threatened or endangered species
- Waste Management - the environmental effects of management of solid and liquid wastes generated by restoration activities
- Environmental Management - cumulative impacts from environmental restoration efforts to correct problems created by past releases to the environment, including groundwater and soil contamination
- Socioeconomics - the effects of construction and operations on the local community
- Cultural Resources - the potential effects on historical, archeological, scientific, or culturally important sites
- Transportation - impacts from onsite and offsite transportation of materials, equipment, products, and wastes
- Decontamination and Decommissioning - the impacts of decontaminating and decommissioning Rocky Flats facilities
- Future land use - the range of alternatives for future land-use options based on projected missions identified during transition

An implementation plan will be prepared for the SWEIS, including a draft outline and a general schedule for development of the SWEIS. DOE expects to complete the implementation plan for the SWEIS in late 1992.

After the draft SWEIS is issued, another public comment period will be held. DOE will consider the resulting comments in preparation for the final SWEIS. DOE will announce its decision regarding the proposed action and its alternatives in a Record of Decision (ROD), which will be available to the public.

9.3.2 Environmental and Waste Management Programmatic Environmental Impact Statement

In October 1990, DOE published its intent to conduct a Programmatic Environmental Impact Statement (PEIS) for activities performed under the Office of Environmental Restoration and Waste Management. The goal of this program is to mitigate potential risks to human health and the environment posed by wastes under DOE jurisdiction.

Environmental restoration activities covered by this PEIS include assessment and physical cleanup of past contamination at DOE installations and other properties as well as decontamination and decommissioning or dismantling of surplus DOE facilities. DOE proposes to approach environmental restoration at all DOE facilities in an integrated, systematic fashion. Waste management operations to be considered in the PEIS include treatment, storage, and disposal of waste generated within the system over time. Wastes reviewed and impacts assessed will be those generated through ongoing nuclear energy, energy research, defense, and environmental restoration activities.

If the PEIS indicates that an integrated approach to ER and WM is not feasible, DOE would continue to conduct environmental restoration activities and waste operations as discrete, site-specific actions. If site requirements were to dictate the need for offsite or new facilities, management decisions would be made on a project-specific basis.

The public scoping meeting for the Environmental and Waste Management PEIS was held in December 1990.

9.3.3 Reconfiguration Programmatic Environmental Impact Statement

In February 1991, DOE announced its proposal to reconfigure its Weapons Complex to be smaller, less diverse, and less expensive to operate.

The Reconfiguration Programmatic EIS will analyze the environmental consequences of proposed and alternative long-term reconfiguration strategies for the DOE Weapons Complex, envisioned to be in place after the year 2000. DOE does not consider it feasible to shut down, dismantle, and relocate current DOE Weapons Complex functions in the near term (before the year 2000) because a relocation site must be selected, technology approved, and facilities designed, constructed, and tested before the existing facilities could be shut down.

9.4 MITIGATION ACTION PLAN

A Mitigation Action Plan (MAP) is required to address commitments to minimize environmental impacts. The MAP explains how the mitigation measures described in the ROD or FONSI will be performed. A MAP must be prepared for any planned action subject to a mitigation commitment.

As mentioned above, MAPs are also required for EAs if the FONSI determination is based on concurrent impact minimization activities. The MAP is to be prepared before a FONSI is issued and must be referenced in the FONSI. MAP monitoring activities accomplish three objectives:

1. Implementation monitoring ensures that techniques identified in the EA or EIS to mitigate environmental impacts are actually used during the course of the project. This type of monitoring verifies that mitigation was implemented as designed and is in accordance with standards and guidelines.

2. Effectiveness monitoring evaluates the mitigation process to verify that the mitigation action has met its objectives and has had no additional or unexpected impacts on the environment that were not previously analyzed in the assessment documentation.

3. Validation monitoring continues after the project has been completed to verify that no problems have arisen during the course of the project. The validation process continues until DOE is confident that all results of the project are environmentally safe.

DOE is required to make copies of the MAP available to the public in the DOE information repositories (see Appendix C) or at other locations. Copies of the MAP are also available upon written request.

APPENDIX A

RESPONSIVENESS SUMMARY FOR FY92 SITE-SPECIFIC PLAN

Responsiveness Summary

Table of Contents

The FY92 Site-Specific Plan for environmental restoration and waste management activities at Rocky Flats was issued in September 1991. A public hearing was held on October 16, 1991, at which the public and citizens' groups were invited to express their concerns and questions. During the public review period (September 10 through November 22), people were invited to submit comments and questions in writing regarding the Site-Specific Plan.

Comment Summary

Comments received on the FY92 Site-Specific Plan were divided into the categories listed below. The number of comments pertaining to each category and the specific comment numbers that apply to each category are also listed. Comments and responses are presented after the summary.

Comment Category	No. of Comments in Category	Comment Nos.
Federal, State, and Local Regulations	3	26, 29, 52
Funding Issues	4	16, 17, 19, 24
Public Involvement	8	4, 9, 10, 13, 15, 18, 27, 32
Storage Issues	4	47, 48, 49, 50
Site-Specific Plan	6	1, 3, 14, 28, 30, 50
Soil Monitoring	3	2, 20, 41
Assumptions	3	6, 7, 54
Solar Pond Cleanout	3	11, 33, 34
Residues	3	21, 25, 51
Air Programs	3	8, 35, 36
Surface Water Issues	3	38, 39, 40
Prioritization	2	5, 37
Plan for Prevention of Contaminant Dispersion	2	12, 31
Technology Development	2	22, 46
Future Land Use	1	23
Environmental Reporting	1	42
Incinerator Permit	1	43
Waste Stream Characterization	1	44

Comment Category	No. of Comments in Category	Comment Nos.
Waste Minimization	1	45
Categorical Exclusions	1	55

List of Commentors on FY92 SSP

Darcee Freier
[redacted]

Geoffrey Jones
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Paula Elofsen-Gardine
Executive Director
Environmental Information Network
(address currently unavailable)

Comments on the FY92 Site-Specific Plan

The following comments were transcribed at the public comment meeting and have not been edited.

COMMENTOR: Darcee Freier, Private Citizen

Comment 1:

I just have a few comments. First, I would like to commend you on having the Site-Specific Plan ready for comments so earlier in fiscal year 1992. This document obviously represents the efforts of many people and I believe they did a good job.

Response 1:

Rocky Flats will continue its efforts to release each Site-Specific Plan before the start of the fiscal year for which the plan is written. The earlier solicitation of comments on the Site-Specific Plan will allow the public to have a more timely impact on the planned activities contained in the Five-Year Plan.

Comment 2:

I support whole-heartedly Section 1.5.2, Future Land Use Policy to use Rocky Flats as a ecological preserve. I agree that the ecological preserve near the metro area will add an important and irreplaceable resource to the surrounding communities. In that light, I would like to ask DOE, EG&G, EPA, CDH, and the public to consider the need for environmental sampling in the buffer zone. I suggest that enough samples be taken to provide the necessary measurements, but not enough to negatively impact the natural wilderness surrounding the plant. I can't help but notice the increased activity as I drive by on Indiana Street, and I wonder about its effects on the eventual preserve.

For each activity, I suggest you ask, is the work being accomplished worth the price to this natural wilderness? Along these lines, I believe that the cost benefits analysis should be undertaken along with statistical analysis to determine the number and placement of environmental samples required.

Response 2:

The presence of the Rocky Flats Plant has provided protection for the preserved habitat surrounding the plant. Environmental monitoring is necessary to protect the buffer zone habitat as well as the surrounding developed areas. While future monitoring should have minimal negative impacts to the habitat within the buffer zone, reductions in sampling activities will be restricted by the need to comply with federal, state, and local monitoring regulations.

Comment 3:

One other comment, I am sure it is just a typo on page E-9, PU&D I believe should be defined as property utilization and disposal.

Thank you for this opportunity to comment on the fiscal year 1992 Site-Specific Plan.

Response 3:

On page E-9, PU&D should be defined as "Property Utilization and Disposal."

COMMENTOR: Barbara Moore, Rocky Flats Cleanup Commission

Comment 4:

The first item I wish to address is concerning the risk prioritization system mentioned on page 1-8. This system is being developed for a national prioritization of all DOE cleanup sites throughout the nation. There was a great lack of public notice and participation in this system. Meetings currently taking place in Virginia were only known to those people or organizations who are highly involved with the Rocky Flats issues. The Cleanup Commission is participating at these meetings and we do appreciate that opportunity. However, it has been expressed to me by the general public that they had no idea this was taking place and expressed to me a great concern that these meetings were not occurring in each of the affected states.

There are suspicions in our area that cleanup activity at Rocky Flats maybe halted or at best severely hampered because of this prioritization system, and the public would like input on this. Perhaps it would be helpful in the future if DOE, EG&G would consult with key public organizations such as the Rocky Flats Cleanup Commission, Green Peace, Sierra Club, the Environmental Monitoring Council, and Environmental Defense Fund. Notify these organizations in advance of all of the public meetings relating to Rocky Flats that are occurring either here or back east and ask these organizations which meetings they feel would have a greater impact or importance to the public, and what levels of information, involvement, and participation they recommend.

Response 4:

The public was invited to comment on the prioritization system in a Federal Register notice dated 9/6/91. The meetings that you described were an effort by a DOE/HQ contractor to gather more information to prepare recommendations to DOE.

Your comments will be shared with DOE/HQ.

Comment 5:

Next, regarding the priority categories, 1, 1(a), 1(b), 1(c), 2, 2(a), 2(b), 2(c), as explained on page 1-10, this needs to be more specific. Exactly which solid waste unit sites are included in 1, 1(a), 1(b), 1(c), etc.

It is conceivable that the public may want some waste sites you have categorized 2(c), we may feel that would be a 1(a) priority, and that input would be appreciated by the public.

Response 5:

The IAG establishes 178 areas of potential radioactive, hazardous, and mixed-waste contamination at Rocky Flats, known as Individual Hazardous Substance Sites (IHSSs). These sites have been grouped by location and waste type into 16 operable units (OUs). As stated on page 1-8, OU 1 and OU 2 have been designated as Priority 1 and all other OUs have been designated as Priority 2. OUs fall under Environmental Restoration activities at Rocky Flats and priority subcategories (a, b, or c) do not apply to these activities. These subcategories are assigned only to Waste Management activities and are shown on the activity data sheets in the Five-Year Plan.

Comment 6:

Assumptions in regard to the assumptions on page 8-3, that current laws, orders, regulations, agreements, and plant policies would continue as stated and Rocky Flats will remain in compliance. This is news to us. When has Rocky Flats been in compliance? We know you are in compliance with certain items but there are several items you are out of compliance with and this needs to be specific.

Response 6:

DOE agrees with the commentor that the statement at the top of page 8-3 needs to be more specific. Specific areas of compliance are being addressed in the Roadmap documents, which will list the compliance status for each applicable regulation. It is assumed that Rocky Flats will achieve or continue compliance with laws, orders, regulations, agreements, and plant policies that are applicable to Rocky Flats operations. The first Roadmap covering low-level and low-level mixed waste will be available to the public in spring of 1992. Other waste-specific Roadmaps will be available as they are developed.

Comment 7:

It was assumed last year and again this year that shipments of waste to WIPP and Nevada will take place. This was commented on last year and it is still an issue this year. DOE must look at alternatives, whatever they may be. There is no indication that any waste repository will be available to Rocky Flats in the near future. You don't know WIPP is going to open in 1992, or 1993, or 1994, or that Nevada or INEL will have these repositories available to us. You must start presenting us with an alternative that is going to handle the waste that is emitted daily and the waste you expect to produce should resumption occur.

Response 7:

DOE is developing the necessary NEPA documentation and safety assessments for the near-term option of storing wastes at various DOE sites. This effort will be completed before any Rocky Flats storage decisions are made. Interim storage of low-level mixed waste at a commercial facility is also being investigated.

Comment 8:

We would like to see as a goal and it listed in the Site-Specific Plans in the future that DOE and EG&G would strive to achieve lower or the lowest achievable emissions rate. This again is a continuing concern of ours and is the only acceptable rate that the public is willing to accept.

Response 8:

Corrective activities at Rocky Flats incorporate many air emissions projects, including development of an inventory of VOC sources, upgrades to radioactive stuck sampling, preparation of Air Pollution Emissions Notices, and identification and survey of existing NESHAPS emissions sources. DOE and EG&G are committed to reducing emissions to the lowest achievable levels.

Comment 9:

I would like to comment on the administrative records that are being held in the public repositories are still incomplete. This has been an ongoing problem. I believe we are now in the second year on this, going on three years that this record is not yet complete in the libraries. This is our only source of information, gentlemen, and in all fairness we should have the complete record out there. It is a requirement of the IAG.

Response 9:

We agree that there has been an unfortunate delay in completing the administrative record for public use at the reading rooms. Currently, the sitewide and OU 4 administrative records are available. The rest of the administrative record index and records are being compiled, and a new management structure is under development. We disagree that the administrative record is your only source of information, as most of the documents that are or will be part of the record are currently available as separate documents at the Rocky Flats Reading Room.

Comment 10:

In the Site-Specific Plan there is an implication, whether it is an oversight or something, I was left with the impression that the Community Relations Plan is final. This is news to me. I believe we are still working on an interim Community Relations Plan and we do not have a final CRP on that and so that would need to be corrected.

Response 10:

The Community Relations Plan was submitted for public review on January 22, 1991. The final plan was accepted by EPA and the Colorado Department of Health and published on December 4, 1991. A complete Responsiveness Summary to public comments was also published on that date. Copies of both are available for review at the various reading rooms. Questions about the Community Relations Plan can be directed to:

Community Relations Plan Information Coordinator
EG&G Rocky Flats Community Relations
T130 F
P.O. Box 464
Golden, CO 80402-0464
(303) 966-5754

Comment 11:

The next major thing that I need to address at this point is a great reliance on EG&G and DOE's part to use the technology with pondcrete in confining your sludge and other waste material. The pondcrete technology since 1988 has been unsuccessful. You have had pondcrete melt, dissolve, turn to jello out there. You have not resolved this issue. I understand you have a new contractor out there but have made no mention to us on what his qualifications are or what his ideas are going to be on how this problem will be solved.

I strongly suggest, again, another alternative to pondcrete, whether you dewater a sludge and make it dry and pack it into barrels, I don't know what the solution is, but give us some alternatives on this.

Response 11:

The reasons for the pondcrete technology failure in 1988 have been reviewed and the lessons learned have been incorporated into the current approach. The present subcontractor was selected specifically for its cementing expertise. The formality of the approach to solidifying pondcrete has been significantly increased beyond the initial effort. The material characterization has been substantially increased, and resulting knowledge and understanding has increased similarly. Furthermore, proof of product quality will be demonstrated in the subcontractor's laboratory in a bench-scale test. Finally, prior to production, a full-scale pilot test will be conducted. Incorporated into the contract for pondcrete solidification is a warranty clause under which the subcontractor is responsible to reprocess any material that fails certification at no additional cost.

Drying and packaging the sludge into barrels, as suggested, would be prone to the same errors as the 1988 pondcrete effort and could result in the storage of material that is not stabilized.

Comment 12:

I want to mention here the Plan for Prevention of Contaminant Dispersion, it was part of the 1991 Site-Specific Plan. In general, I believe that the public is better protected with this PPCD, but I would raise great concern for the worker health and safety out there. This plan is totally lacking for the worker's health and safety out there, and if I were a member of CANDID or other organizations, I would strongly be looking at this PPCD, because I feel it is totally inadequate to protect your workers and you should look this over in '92 and make this part of one of your objectives for '92.

The Cleanup Commission will be submitting written comments on this in more detail and you would expect these before the deadline.

Response 12:

The health of workers is monitored at regular intervals. Records are maintained and workers are encouraged to review their respective information. This is a health and safety issue and it is beyond the scope of the Site-Specific Plan.

COMMENTOR: Geoffrey Jones, EG&G Employee

Comment 13:

I don't believe that many of the objections that are voiced against Rocky Flats are motivated by concerns about pollution, radiation, health, etc. I believe that the objections are an attempt to slow down the defense effort of the United States. I believe that many of the people who are very sincere in their objections to pollution or whatever have been duped, have been duped by the press, and have been duped by organizations that I believe are funded by the Soviets, in order to do anything they can to nip at the heels of the United States defense effort. There is a lot of nitpicking arguments about every plan, every procedure that comes up.

And it would seem if those arguments were all listened to, that there is absolutely nothing right with any plan, any procedure, anything that goes on at Rocky Flats. It would also seem that every ounce of pollution that is downwind of Rocky Flats is because of Rocky Flats, because of malicious action at Rocky Flats.

I think that the public is beginning to realize that people have cried wolf too long with no real basis for it. It has been going on since the early '60s that pollution is bad, atomic weapons are bad, anything that makes the United States move forward is bad. Anything that holds the Soviet Union is a really bad thing.

I don't believe we can trust the Soviets; they've lied to us since 1917. I don't think they are going to change overnight. I think that we need Rocky Flats. I think that we need it up and running and I think that we need to operate in a real-world atmosphere, not in a never-never land of absolutely nothing ever going wrong.

Also, I see many of the solutions that have been developed to get rid of hazardous waste to cleanup pollution being picked up and picked. That is why the WIPP site isn't open right now is because there are people protesting it. That is why we can't ship hazardous waste to Idaho, because people protest it. And they protest it, I believe, not out of a concern for the environment, not out of a concern about pollution, but simply to stall the United States defense effort.

I urge you to consider that when you see all of the nitpicking arguments that have been aimed at these carefully conceived plans and realize what the motivation for them are.

Response 13:

Thank you for your comment.

COMMENTOR: Ronald Harlan, Citizen

Comment 14:

I hate to begin with an apology. I apologize to the panel and the people here, I have not had a chance to read this document word-for-word, but I have gone through partially and as rapidly as I can and I want to compliment the DOE and no doubt with some help from EG&G for putting together a good document. It looks on the whole like a good plan.

I am trying to make this comments not as an employee or not supporting it, but from as unbiased point of view as I can achieve.

I am sorry that I don't have specific kudos nor specific grumbles. I think that these public information meetings and public comment periods are good and that they will allow the DOE to fine tune the plan as we go down through the years towards remediation management and clean-up. So, basically I have as a general comment, it looks good and I compliment you.

Response 14:

Thank you for your comment.

COMMENTOR: Paula Elofson-Gardine, Environmental Information Network

Comment 15:

One of the issues of concern also in regard to the budget process here is that it continues to be what appears to be a futile retroactive rather than a proactive access if our comments made from the previous year are discussed in the following year plan. Really, these plans need to come out in a draft form before--to allow public comment before it goes to a final

form, because otherwise, really there is no impact from the comments that are solicited for these plans.

Response 15:

Public comment on the Site-Specific Plan is solicited every year for input on the future year's activities for which funding has not yet been allocated and for input on final allocation of current-year funding. Relevant comments are being evaluated for incorporation into the FY94-98 Five-Year Plan, which is presently under development.

Comment 16:

In light of that it makes the hearing process rather a moot process at best. We would ask that in the future, I would like to see a further breakdown in these plans of what is actually R&D versus safety-related items. And that production costs or production budget items not be hidden under the auspices of safety, upgrades, or R&D.

Response 16:

The Site-Specific Plan describes the environmental programs that are funded by DOE Defense Programs (DOE-DP). Appendix A of the FY92 SSP lists planned activities required for Environmental Restoration and Waste Management and their funding allocations. Base Environmental Programs and Waste Management Base Programs are funded by DP. Production items are not included in the Site-Specific Plan because they cannot be funded from Environmental Management (EM) allocations.

Comment 17:

In retrospect, there are also some concerns with respect to the public relations budgeting process and that there not be misappropriation or misuse of taxpayer monies for questionable practices and I will be submitting further written comments.

Response 17:

There has not been any misuse or misappropriation of federal monies for communication activities at Rocky Flats. All community relations expenditures are covered in EG&G's contract with DOE. If communication activities are desired that are not covered in EG&G's contract with DOE, they are paid for by funds provided by EG&G, Inc., the parent company of EG&G Rocky Flats, Inc.

COMMENTOR: Ken Korkia, Rocky Flats Cleanup Commission

Comment 18:

Page 1-1: At the bottom of the page is a reference to a Rocky Flats Five-Year Plan. Is this a document for public review? The Cleanup Commission believes that public participation

in the development of this Five-Year Plan would be a proactive exercise whereby we could have greater input into the actual planning of future activities. Although the time-frame from releasing these annual Site-Specific Plans has been compacted, our current review for FY91 is more reactive than proactive.

Response 18:

A public reading room at the Front Range Community College Library in Westminster contains historical and current documents pertaining to Rocky Flats, including the Five-Year Plan. The public is encouraged to use the reading room for research and document review. Also, please refer to response numbers 15 and 27.

Comment 19:

Page 1-3: Much of the routine monitoring that is vital for the public's health protection is funded under the Base Environmental Programs, which are part of the operations budget under Defense Programs. In the future as the plant is finished with its production mission and is transferred to Environmental Management, will there be a guarantee that the base programs will continue to receive the same amount of funding, or will they have to compete for funding the same as all other ER activities? In essence, will there still be the equivalent of an operation's budget that will fund the "routine operations" type of activities?

Response 19:

If the plant mission is changed, EM will assume responsibility for funding activities, previously funded by DP, that support environmental restoration projects and public safety goals. Funding levels will reflect DOE's commitment to the remediation of sites in accordance with the level of environmental and public risk they present.

Comment 20:

Page 1-3: In the first paragraph is stated the "soil-related activities include routine sampling of soils on plant site and soil sampling to support special projects." What are these special projects?

Response 20:

With respect to soil monitoring, special projects include construction projects, in which sampling is done to ensure worker safety.

Comment 21:

Page 1-3: The last paragraph states that mixed residues are destined for recycle rather than disposal. What is meant by recycling? Is the PRMP being reconsidered? What is the need to recycle plutonium?

Response 21:

In this case, recycling actually means separating the plutonium from the waste portion of the residue. This separation substantially reduces the quantities of waste to be shipped to a repository. Plutonium recycling is essential to support all the waste storage, transportation, and disposal scenarios and meet the residue Compliance Order of July 31, 1991, and related agreements. Adequate facilities do not exist at Rocky Flats for separating the residues; therefore, new facilities or modification of existing facilities will be required.

We are not reconsidering the PRMP. However, the planned facilities are similar to some of the PRMP facilities but do not involve producing plutonium metal. In these facilities, the separated plutonium would be recovered as plutonium oxide. The primary mission of the Residue Elimination Project is to convert residues into disposable waste forms.

Comment 22:

Page 1-4: The top paragraph states the "Technology Development projects at Rocky Flats focus on minimizing waste, creating waste forms suitable for land disposal, developing better methods for assaying waste, and enhancing monitoring capabilities." What about treatment technologies for environmental restoration? What plans are there to develop technologies for treating contaminated soil and water? The Cleanup Commission urges the DOE to place stronger emphasis on these cleanup technologies.

Response 22:

The Remedial Investigation/Feasibility Study process under CERCLA is designed to accommodate new information, new direction, and new technologies as they become available. The Feasibility Study (or Corrective Measures Study), which includes treatability studies and evaluation of remedial alternatives, depends on sitewide treatability studies to expedite the Feasibility Study. The purpose of the sitewide treatability studies is to evaluate potentially applicable treatment technologies for media at Rocky Flats that are anticipated to require treatment. These treatment technologies will be used as candidate technologies in the OU-specific treatability studies and for the range of alternatives available for the Feasibility Study. At Rocky Flats, the Environmental Management division has appointed a Technology Development liaison to enhance understanding among various divisions.

Comment 23:

Page 1-7: We are intrigued by mention in the first paragraph that "DOE is also considering a policy for future land use, which secures the Rocky Flats site as an ecological preserve." Later description at the bottom of the page and extending to page 1-8 describes the plan in general terms. How far along are these plans? Is this truly a serious consideration? We would appreciate more information especially as it relates to the U.S. Atomic Energy Commission Environmental Statement of April 1972.

Response 23:

Future land use of DOE-managed properties nationwide will be considered in the DOE Environmental Management Programmatic Environmental Impact Statement (PEIS). Also, the DOE Sitewide Environmental Impact Statement (SWEIS) will consider an ecological preserve as one of several future land uses for the plant site. In addition, future land use as an ecological preserve will be considered the most credible scenario for onsite Rocky Flats risk assessment conducted under CERCLA, RCRA, and the January 22, 1991, Interagency Agreement signed by DOE, EPA, and CDH.

DOE is seriously considering future land use of the Rocky Flats as an ecological preserve. Note that this has already been implemented at other DOE facilities such as the Oak Ridge National Laboratory in Tennessee, where designated portions of the reservation are ecological preserves.

Comment 24:

Page 1-13: The last sentence of the first full paragraph states "only the maximum funding level will be adequate to ensure that all regulatory and agreement commitments are met on schedule." We appreciate your candor and exhort the DOE to accept this responsibility not only at the local level, but at the national level as well.

Response 24:

Thank you for your constructive comment.

Comment 25:

Page 1-21: The Site-Specific Plan describes a new directorate, Residue Conversion and Regulatory Intervention, as part of the Environmental and Waste Management organization. The range of this new directorate's responsibilities includes residue elimination, decontamination and decommissioning planning, regulatory interactions, and providing support for reconfiguration. This seems like a rather broad view for this directorate. Would it not be better to separate out some of these activities into their own directorate where they might receive more focused attention.

Response 25:

State of Colorado Compliance Order 91-07-31-01 is the document that currently governs compliance activities at the site. The residue conversion and regulatory interaction directorate is responsible for implementing all current and future activities related to the Compliance Order.

Comment 26:

Page 1-23: The last paragraph of section 1.7.3 refers to the FFCA for LDR wastes and states that a two-year extension of this FFCA was signed on May 10, 1991. Has the

Colorado Department of Health approved this extension? What is the status of the negotiations on the FFCA for LDR wastes?

Response 26:

The two-year extension of the FFCA, which was signed on May 10, 1991, was between DOE and EPA. Rocky Flats has received no explicit objections from CDH to the agreement with EPA. "Negotiations are expected to resume after the resolution of negotiations surrounding the residues issues."

Comment 27:

Page 1-28: The Cleanup Commission would like to draw the DOE's attention to the chart of the Federal Budget Process. In that chart we call attention to the fact that the field budget call for FY94 begins in January 1992. In order to facilitate increased public participation, the DOE must allow the public's input during this field call period. In order for us, the public to have any input in FY94 we must become involved in January 1992.

Response 27:

DOE has asked EG&G to prepare a public involvement plan to address this issue. In the interim, it is the goal of the Rocky Flats Office to involve the public more in the budget process. This includes additional presentations before the Rocky Flats Environmental Monitoring Council, the Technical Review Group, and other interested parties. Individuals and groups desiring more information should contact EG&G Community Relations at (303) 966-5754. Also, please refer to response number 15.

Comment 28:

Page 3-23: The last sentence of the second paragraph of section 3.4.2 contains the word "eolian." This word is not exactly "user friendly."

Response 28:

"Eolian" is a geologic term used to describe materials that have been transported by wind action.

Comment 29:

Page 3-26: In section 3.4.3 mention is made that the deep plowing required by the *McKay v. United States* lawsuit has been stopped because it was in violation of CERCLA/SARA. What is the nature of this violation? Was there or is there any public health threat as a result of these plowing activities? Will the reclamation program to reestablish the ground cover in the plowed areas continue?

Response 29:

The deep plowing required by the *McKay v. United States* lawsuit began before Rocky Flats became a CERCLA site. However, the EPA contends that Remedial Investigation/Feasibility Study under CERCLA needs to be completed before plowing as a method of remediation continues. The potential violation is the lack of an Remedial Investigation/Feasibility Study. There are no known public health threats as a result of past plowing activities. Human health risks associated with the plowing action were assessed in Final Past Remedy Report, DOE, May 1991, which is available in Rocky Flats public reading rooms. Revegetation activities to reestablish a vegetative ground cover continues, as directed by the 1985 Settlement Agreement.

Comment 30:

Page 3-19 to 3-33: The narrative description of the different OUs is well-written and informative. It would be beneficial though, for there to be a quick point by point summary of the exact activities to be performed in FY92. This summary could be placed at the end of the narrative for each OU. It is hard to determine from the narrative exactly what activities are planned for the current year.

Response 30:

The FY93-97 Five-Year Plan contains activity data sheet for each OU. Each activity data sheet includes a narrative on the planned accomplishments for the Budget Year (FY92) and the outyears.

Comment 31:

Page 3-28: The document states that the responsiveness summary for the final Plan for the Prevention of Contaminant Dispersion was prepared in FY91. Where is it?

Response 31:

The draft Plan for the Prevention of Contaminant Dispersion was released for public comment on July 30, 1991. The draft final plan and responsiveness summary was delivered to the regulatory agencies (CDH and EPA), as required, by November 25, 1991. They returned the document to Rocky Flats with extensive comments. The final plan and responsiveness summary, which will incorporate agency comments, is due back to the agencies by February 25, 1992. Pending their approval, the final document should be available at the reading rooms by the end of March 1992.

Comment 32:

Page 3-29: With regard to the Sitewide Environmental Impact Statement, will there be some sort of scoping document prepared for public review? If so, when can we expect to see it?

Response 32:

Yes. The SWEIS Implementation Plan will be completed and delivered to the reading rooms during the last quarter of 1992.

Comment 33:

Page 3-32: In the description of the solar evaporation pond dewatering, is the method described, consisting of natural evaporation, enhanced natural evaporation, and forced evaporation, reflective of the IM/IRA which has been prepared for OU 4? Are there any alternatives to the pondcrete operation? Given the first-time failure of this operation, the Cleanup Commission remains skeptical of the future success of pondcrete and questions its public/worker health and safety aspects.

Response 33:

The procedures for evaporation of the solar ponds are included in the IM/IRA for OU 4. Response number 11 addresses the comment regarding the pondcrete operation.

Comment 34:

Page 3-33: Are the timetables for pond sludge removal and solidification in FY92 realistic? How long will it take just to remove the water? Shipment is planned to the Nevada Test Site in FY93. Again, is this timetable realistic? What alternative is there to storage of pondcrete at the Nevada Test Site?

Response 34:

Pond sludge will be removed and solidified by November 1992. Water removal will be a continuing effort to maintain the ponds in dry condition. The Nevada Test Site is projecting that they will open and have all procedures in place to support shipment in FY93. Currently, there is no alternative for long-term storage other than the Nevada Test Site.

Comment 35:

Page 4-3: The third paragraph under "Air Program Upgrades" refers to the Radioactive Monitoring (Criticality) Network. What is the status of this project? Should it not be in place before any restart of plutonium operations? Mention is made that NEPA review is ongoing. Would it not be beneficial to seek a categorical exclusion to speed-up this process?

Response 35:

The scope of the "Air Program Upgrade" has been reduced for FY92 because of funding reallocations. The Radioactive Monitoring Network has been deferred. NEPA documentation for the criticality network has been completed and is currently under review. This network was required to be in place before restart of plutonium operations.

Comment 36:

Page 4-5: The first full paragraph at the top of the page refers to HEPA filter and dust resuspension studies which were completed. Is the dust resuspension study the PPCD? The members of the Cleanup Commission would like to review the HEPA filter study.

Response 36:

The Plan for the Prevention of Contaminant Dispersion is not the same as the dust resuspension study. The HEPA filter and dust resuspension studies are technical studies performed by the Air Quality and Chemical Tracking Division of Rocky Flats to assess compliance with the Clean Air Act. The Plan for the Prevention of Contaminant Dispersion was submitted to EPA as part of the Interagency Agreement. The HEPA filter study is not yet available at the public reading rooms, but we will try to make it available in the near future.

Comment 37:

Page 4-9: In reference to the "Dam Reinforcement at Ponds A-4, B-5, and C-2," the Cleanup Commission urges that top priority be given to this project. Emergency releases of untreated or untested waters from these ponds are viewed as a serious threat to the public's health.

Response 37:

There is a contingency plan for emergency release of water should dam safety be at risk. This contingency plan has never been used and all water discharged has met quality requirements as defined by the Agreement in Principle. The Corps of Engineers is currently evaluating terminal pond dams to define whether upgrades are required.

Comment 38:

Page 4-12: The first sentence at the top of the page refers to the proposed "West expansion office project." What is this project?

Response 38:

Line item funding has been requested for offices and other administrative and support facilities at the western side of the plant.

Comment 39:

Page 4-12: The second paragraph mentions a study of the feasibility of reusing Sewage Treatment Plant effluent at the plant site. Is this water to be used as part of the raw water system for industrial purposes? This paragraph also mentions a study of the appropriateness of spray irrigation for wastewater disposal. Given the past problems with soil and groundwater contamination as a result of this practice, is this a wise option to pursue?

Response 39:

Alternate uses of sewage treatment plant effluent are still in the conceptual stage as are evaluations of spray irrigation. Any decisions on effluent recycle or spray irrigation would be coordinated with regulators for any required approvals.

Comment 40:

Page 4-12: The section on Surface Water Monitoring and Program Upgrades does not mention the Option B proposal. The appendix, page A-2, shows ADS 3294 C, Offsite Water Management (Option B) as receiving $5 M. What activities are planned for this program in FY92?

Response 40:

Option B is mentioned on page 4-11 of the Site-Specific Plan. Please refer to the Surface Water Management Plan for a detailed discussion of Option B.

Comment 41:

Page 4-14: The bottom of the page under "Soil Monitoring" describes a new effort to collect data on other radionuclides besides plutonium. The Cleanup Commission wholeheartedly endorses such an effort.

Response 41:

Thank you for your constructive comment.

Comment 42:

Page 4-15: In the first paragraph under "Environmental Reporting," a statement is made that the 1990 Site Annual Environmental Report was prepared and reviewed in FY91. Where is this report? We do not understand why there is a full year lag before these reports are made available to the public. Since they are a review of the data that has already been collected, we urge Rocky Flats to dramatically accelerate the time-frame on the Annual Report's release.

Response 42:

The 1990 Site Annual Environmental Report must include site monitoring data collected throughout 1990. Some of this data was not available until 1991. Preparation of the report could not begin until all data had been compiled and analyzed. Release of the report is delayed by extensive DOE internal reviews. DOE will attempt to accelerate the review process for future Site Annual Environmental Reports.

Comment 43:

Page 5-4: The third paragraph under Section 5.2.2 mentions in the list of permit actions the incinerator permit modification. Please provide details on this permit modification. The Cleanup Commission hardly needs to remind the DOE of the public's perception of any incineration activities at the plant.

Response 43:

The incinerator permit modification is not currently being pursued.

Comment 44:

Page 5-5: The Cleanup Commission is staggered by the fact that 4,004 identified output streams in 101 buildings as part of the waste stream analysis and that 165 buildings remain to be updated.

Response 44:

As stated, over 4,000 output streams have been identified to-date and are described in the Waste Stream and Residue Identification and Characterization (WSRIC) books for 101 buildings. These 101 books include all residue buildings and the major production buildings at Rocky Flats. The remaining buildings for which output streams are to be identified and described in WSRIC books are small support buildings with few output streams. It is not currently expected that the number of output streams will significantly increase by virtue of examining these remaining buildings.

Comment 45:

Page 5-6 to 5-10: The Cleanup Commission encourages the plant's waste minimization program as long as such program is geared towards generating less waste and not just mechanically reducing the volume (i.e. compaction). As we stated in our comments for the FY91 Site-Specific Plan, the most effective waste minimization program would be total cessation of production activities that generate the waste.

Response 45:

As stated in the Site-Specific Plan, the objectives of the waste minimization program are to reduce the volume and toxicity of all generated wastes and to recycle, recover, and reuse waste material whenever possible. None of the methods listed in Section 5.3 involve compaction after the waste has been generated. The present and future mission of the plant is presently being reevaluated by DOE and Congress. When and if the mission of the plant is changed, the waste minimization program will have to be revised for any changes to scope of work.

Comment 46:

Page 5-19: Microwave solidification is mentioned as the eventual replacement of cementation as the primary waste treatment methodology. Because this is a thermal process, the Cleanup Commission views this process with skepticism. We encourage RFP to share any and all information with the public about this process. We would like to have some sort of public information/comment meeting on this technology.

Response 46:

The objective of the Microwave Solidification Project is to obtain operational data and engineering design criteria necessary for the implementation of a production-scale process. Microwave solidification is being developed to address treatment of precipitation sludge from the liquid waste treatment facility in Building 374. This waste stream is generated at a rate of 1210 cubic feet per year, with a current backlog of 18,300 cubic feet, and as such, is one of the largest waste problems at Rocky Flats. Current treatment of this waste stream is accomplished by cementation, which is not an optimum treatment technology, and results in large waste volume increases. Through microwave solidification, DOE sites subject to waste storage limitations and waste shipment and disposal criteria may improve waste forms and reduce waste volume by approximately 5 to 10 times over present solidification procedures. Specifically, this technology will immobilize radionuclides and heavy metals; it will remove water, which is the source of ground water mobilization and hydrogen generation; and it eliminates releasable particulates. Additionally, the process equipment is more easily maintained.

Rocky Flats is considering holding a public meeting concerning the Microwave Solidification Project. If such a meeting were to take place, our technicians would be available to participate.

Comment 47:

Page 5-25: The third paragraph of section 5.5.1 mentions that "DOE is developing the necessary NEPA documentation and safety assessments for the near-term option of storing wastes at various DOE sites." How far along in the NEPA process is this effort?

Response 47:

Currently, DOE is only investigating possible alternatives in order to develop an appropriate proposal action. Investigations are still conceptual in nature.

Comment 48:

Page 5-25: Under section 5.5.2 the statement is made that "the present permitted storage capacity for low-level mixed waste at Rocky Flats is 26,317 cubic yards." Is this figure correct?

Response 48:

The present permitted storage capacity for low-level mixed waste at Rocky Flats is 3,540 cubic yards, plus 6,400 gas cylinders. The figure of 29,440 also includes interim status units currently storing pondcrete and saltcrete.

Comment 49:

Page 5-26: The second paragraph of section 5.5.3 refers to a 904 Pad. Where exactly is this pad, or did you mean to refer to the 903 Pad?

Response 49:

The 904 Pad is located in the southeast corner of the plant site, just west of the 903 Pad.

Comment 50:

Page 5-26: The third paragraph, section 5.5.3 mentions that RFP has a new "Real-Time Radiography machine." What is this machine, what are its capabilities, and how does it operate?

Response 50:

The real-time radiography (RTR) machine is used to x-ray waste containers for evidence of free liquids. No detectable free liquids can be present for containers to be approved for shipment to offsite repositories. At the same time, radiographic images are compared to item description codes to increase confidence that the packaged waste forms are as described by the applicable code.

Comment 51:

Page 5-26: The fifth paragraph, section 5.5.3 refers to the construction of a new building for residue drum management and storage. Is this facility planned as a compliance measure for the permit injunction issued by the U.S. Court in August 1991? We note that the building completion is not planned until FY96, well beyond the two-year expiration date of the injunction. This Site-Specific Plan should have a separate section that addresses the residue compliance issue. The Cleanup Commission recommends that the residue compliance issue be addressed under Corrective Activities in order to focus full attention on the two year time-frame the court has given DOE to correct the residue storage problem.

Response 51:

The new building for residue drum management and storage is not a compliance measure for the August 1991 permit injunction. The primary regulatory drivers are DOE Orders, RCRA, external agreements, and internal policies to reduce exposure and minimize costs.

Comment 52:

Page 5-27: The third paragraph under the Disposal section describes what LDRs are. The Cleanup Commission notes however, that no details are given as to the status of the compliance agreement for LDRs other than the statement on page 5-30 that negotiations are still in progress between DOE and CDH. How can RFP continue to generate LDRs without the approval of CDH? What are the plans to gain compliance for LDRs?

Response 52:

Land Disposal Restrictions regulate the disposal of certain hazardous wastes. LDRs do not directly regulate the generation of those wastes.

Comment 53:

General comment: All in all this section was well-presented and informative. The bullet outline style is appreciated and should serve as a model for future editions of the Site-Specific Plan.

Response 53:

(This comment refers to Section 6.) Because Technology Development is a systematic approach to implementing innovative or existing technologies, the outline style is appropriate. Other sections of the Site-Specific Plan involve complex management issues, which cannot be summarized in outline form.

Comment 54:

Page 8-3: The first statement at the top of the page is rather bold in its claim that "it is assumed that current laws, orders, regulations, agreements, and plant policies will continue as stated and Rocky Flats will **remain** in compliance." As we previously have mentioned, RFP continues to have compliance problems with residues and LDRs.

Response 54:

Please refer to Response No. 6.

Comment 55:

Page 10-3: In the description of categorical exclusions, it is stated that "the list of CXs is defined and approved by DOE." Is there any external oversight of this process?

Response 55:

The NEPA Compliance Committee, which identifies potential categorical exclusions, was established by the Rocky Flats Plant. The decision to grant a CX for specific Rocky Flats projects is made by DOE-HQ. The decision is available for public comment and input in the Federal Register.

APPENDIX B

ACTIVITY DATA SHEET CROSSWALK

ROCKY FLATS PLANT
ACTIVITY DATA SHEET CROSSWALK

ENVIRONMENTAL RESTORATION		
NEW ADS	**TITLE**	**OLD ADS**
1001	OU 1 - 881 Hillside	1001A 1001B
1002	OU 2 - 903 Pad, Mound, and East Trenches	1002A 1002B
1005	OU 5 - Woman Creek	1005A 1005B
1006	OU 8 - 700 Area	1006A 1006B
1007	OU 12 - 400/800 Area	1007A 1007B
1008	OU 13 - 100 Area	1008A 1008B
1009	OU 16 - Low-Priority Sites	1009A
1010	OU 14 - Radioactive Sites	1010A 1010B
1011	OU 3 - Offsite Areas	1011
1012	Sitewide Programs	1012
1014	OU 6 - Walnut Creek	1014A 1014B
1018	OU 15 - Inside Building Closures	1018A 1018B
1231	OU 10 - Other Outside Closures	1231A 1231B
1233	Program Management Support - Environmental Restoration	1233
1251	OU 9 - Original Process Waste Lines (OPWL)	1251A 1251B
1255	OU 7 - Present Landfill	1255A 1255B
1258	OU 4 - Solar Evaporation Ponds	1258A 1258B
1261	OU 11 - West Spray Field	1261A 1261B
1263	Oxnard Facility	1263A 1263B
1264	Onsite/Offsite Water Management	1264
1271	Decontamination Facilities - Environmental Restoration	None
1272	Waste Handling/Treatment Facilities - Env. Restoration	None
6001	Program Direction (DOE-RFO) - Environmental Restoration	6001

WASTE MANAGEMENT		
NEW ADS	**TITLE**	**OLD ADS**
3031-1	Program Direction	6002-6005
3812	Program Control	None
	Compliance Program Management	81
	Waste & Environmental Data Management	90
	Program Support for Compliance Activities	3293
	Waste Programs Procedures	3177
	Waste Quality Implementation and Maintenance	3177
	Waste Management Engineering Project Management	3177
	Waste Management Qualifications	3177
	Waste Management Planning & Budgeting	3177
	Waste Management Storage Programs	3177
	Waste Management Program Integration Control	3177
	Waste Management Assessment & Compliance	3177
	Residue Waste Management Programs	3407
3813	Waste Minimization Planning	3242
3814	Agreement in Principle (Colorado)	None
	Payments to State - Rocky Flats	3294A
	Payments to State - DOE Nevada Field Office	None
	Payments to State - Rocky Flats Permitting Fees	None
3815	Payments to Local Communities	3294C
3821	Facility Operations and Maintenance	None
	Work for Others	3402
	Offsite Transportation/Disposal of Waste	3157
	Saltcrete Disposal	3164
	Waste Assay & Shipping	3168.1
	Hazardous Waste Operations	3168.2
	Waste Certification	3260
	Liquid Waste Operations, Building 374	3148
	Liquid Waste Operations, Building 774	3149.1
	Solid Waste Operations, Protected Area (PA)	3169
	Sewage Treatment Plant Operations	5049
	Onsite Landfill Operations	5057
	Implement Comprehensive Wastewater Management Plan	3290

WASTE MANAGEMENT		
NEW ADS	**TITLE**	**OLD ADS**
3822	New Facility Planning	None
	Waste Processing Facility, Inside PA	3000
	Waste Processing Facility, Outside PA	3001
	Low-Level Mixed Waste Storage Facility	3150
	Building 776 Upgrade	3137/3151
	Residue Elimination Project	None
	TRU Waste Operating Facility	None
	Baler Upgrade, Building 889	3408
	Sludge Immobilization System, Building 774	3166
	Supercompactor II	None
	Advanced Size Reduction Facility (ASRF) Assay System	3134
3823	General Plant Projects	None
	Building 569 Addition	3136
3826	Capital Projects	None
	Improve Advanced Size Reduction Facility, Building 776	3146
	Nitrate Salt Immobilization System, Building 374	3156
	Organic Process System, Building 776	3158
	Supercompaction & Repackaging Facility - Upgrade	3171
	Waste Evaporation Renovation, Building 374	3174
	Steam Cleaning/Stripping	3298
	Sludge Immobilization System, Building 776	3400
	Thermal Treatment Process Unit	3401
	Polymer Solidification	4118A
	Waste Cementation Upgrades, Building 776	3286
	Pave Unit 10 Storage Area, Building 561	3168.3
3827	Sewage Treatment Plant	3288
3828	New Sanitary Landfill	3153
3829	Bldg. 374, Liquid Waste Treatment Facility Upgrade	3135
TBD	Facility Transition, DOE-DP to DOE-EM	None
Canceled	Sludge Immobilization System, Building 374	3167
Canceled	Liquid Waste, Building 774	3149

WASTE MANAGEMENT		
NEW ADS	**TITLE**	**OLD ADS**
Canceled	Baler Upgrade, Building 776	None
Canceled	Process Waste/Transfer System	3160
CORRECTIVE ACTIVITIES		
3824	Corrective Activities - Waste Management	None
	Upgrade Radioactive Stack Sampling	83
	Survey and Identify Existing NESHAPs Emissions	109
	Saltcrete	3177-HQ

APPENDIX C

DOE INFORMATION REPOSITORIES

DOE INFORMATION REPOSITORIES

The Community Relations group of EG&G operates the DOE Rocky Flats Public Reading Room for DOE. The reading room is located at Front Range Community College.

The reading room is one of five information repositories established to ensure public access to unclassified information regarding environmental restoration activities at Rocky Flats. Of these facilities, only the reading room and the Standley Lake Branch of the Jefferson County Public Library in Arvada, Colorado, employ full-time librarians and are open during the evening.

Services and Equipment

The reading room offers several ways for members of the public to obtain information. People who would like assistance can consult a full-time librarian with access to a computerized bibliography and abstracts. In addition, because the reading room's stacks are open, members of the public may look for documents on their own. Documents are organized according to a simple, color-coded system (described below). Members of the public may also perform computer-based text searches on their own. EG&G's Community Relations organization is planning to develop a tutorial specifically for this application for those unfamiliar with FileMaker software.

All catalogued documents must remain in the reading room (no check-outs allowed). However, people are welcome to make photocopies to take with them. They may photocopy up to 200 pages free of charge; thereafter, the cost is five cents per page.

A microfiche reader and a microfiched copy of documents contained in the Administrative Record were made available in FY91. The Administrative Record consists of documents pertinent to the selection of CERCLA response actions.

Documents in the Reading Room

The reading room contains a variety of documents pertaining to Rocky Flats. Some of these are legally required under CERCLA and the IAG. DOE and EG&G have also made available references that explain or otherwise complement such documents as well as documents that members of the public have requested.

The list of present holdings is updated each month by the librarian. Free copies of the list are available in the reading room.

Documents Required by CERCLA and the IAG

- RCRA Facility Investigation/CERCLA Remedial Investigation Work Plans (Draft and Final)
- RCRA Facility Investigation/CERCLA Remedial Investigation Reports (Draft, All Phases, and Final)
- RCRA Corrective Measures Study/CERCLA Feasibility Study Reports (Draft, All Phases, and Final)
- CERCLA Proposed Remedial Action Plans (Draft and Final)
- Interim Measures/Interim Remedial Action Plans and Decision Documents (Draft, Proposed, and Final)
- Responsiveness Summaries
- RCRA Corrective Action Decisions/CERCLA Records of Decisions (Draft and Final)
- RCRA Corrective Design/CERCLA Remedial Design Plans
- RCRA Corrective Design/CERCLA Remedial Design Work Plans
- Community Relations Plans
- Sampling and Analysis Plans
- Plan for Prevention of Contaminant Dispersion
- Background Study Plan
- Treatability Study Plan
- Work Plan to Implement Discharge Limits for Radionuclides
- Interim Measures/Interim Remedial Action Implementation Document and Certification of Completion
- Historical Release Report
- Monthly Progress Reports
- Health and Safety Plan
- Baseline Risk Assessment Technical Memoranda
- RCRA Corrective Measures Study/CERCLA Feasibility Study Technical Memoranda
- RCRA Facility Investigation/CERCLA Remedial Investigation Work Plan Technical Memoranda
- Priority Proposal for Operable Units 3, 5, 6, 8, 12, 13, 14, 15, and 16

Catalog System

Under the reading room's catalog system, color-coded labels identify three broad categories of documents.

Yellow labels denote text from news media. These records include news clippings from January 1989 to the present, journal articles, symposia reprints, and press releases.

Serials are indicated by blue labels and cover many types of periodically issued items such as environmental monitoring reports, findings from oversight committees, the plant newspaper, and the plant policy manual.

Red labels designate reports. The first two numerals shown on each label indicate the year that the report was issued. As with serials, reports span a variety of subjects, including

investigations, soil surveys, environmental impact statements, health studies, RCRA permit applications, sampling and analysis plans, and transcripts of public meetings.

An authorized classifier reviews and approves all documents for public reading, as no classified or unclassified controlled nuclear information (UCNI) materials are allowed in the reading room. In some cases, however, an unclassified version of a classified document is produced for public use.

The locations and hours of the Reading Room and the four other public repositories are listed below.

DOE Rocky Flats Public Reading Room
Front Range Community College
3654 West 112th Avenue
Level B, Center of Building
Westminster, Colorado 80030
Phone: (303) 469-4435
Hours:
Monday - Tuesday 12:00 noon - 8:00 p.m.
Wednesday 11:00 a.m. - 4:00 p.m.
Thursday - Friday 8:00 a.m. - 4:00 p.m.

Rocky Flats Environmental Monitoring Council
1536 Cole Boulevard, Suite 325
Denver West Office Park, Building 4
Golden, Colorado 80401
Phone: (303) 232-1966
Hours: Monday - Friday 8:30 a.m. - 5:00 p.m.

Colorado Department of Health
Rocky Flats Program Unit
4210 East 11th Avenue, Room 420
Denver, Colorado 80220
Phone: (303) 331-4855
Hours: Monday - Friday 8:00 a.m. - 5:00 p.m.

U.S. Environmental Protection Agency Region VIII
Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202
Phone: (303) 293-1807
Hours: Monday - Friday 8:00 a.m. - 4:30 p.m.

Jefferson County Public Library
Standley Lake Branch
8485 Kipling
Arvada, Colorado 80005
Phone: (303) 423-4600

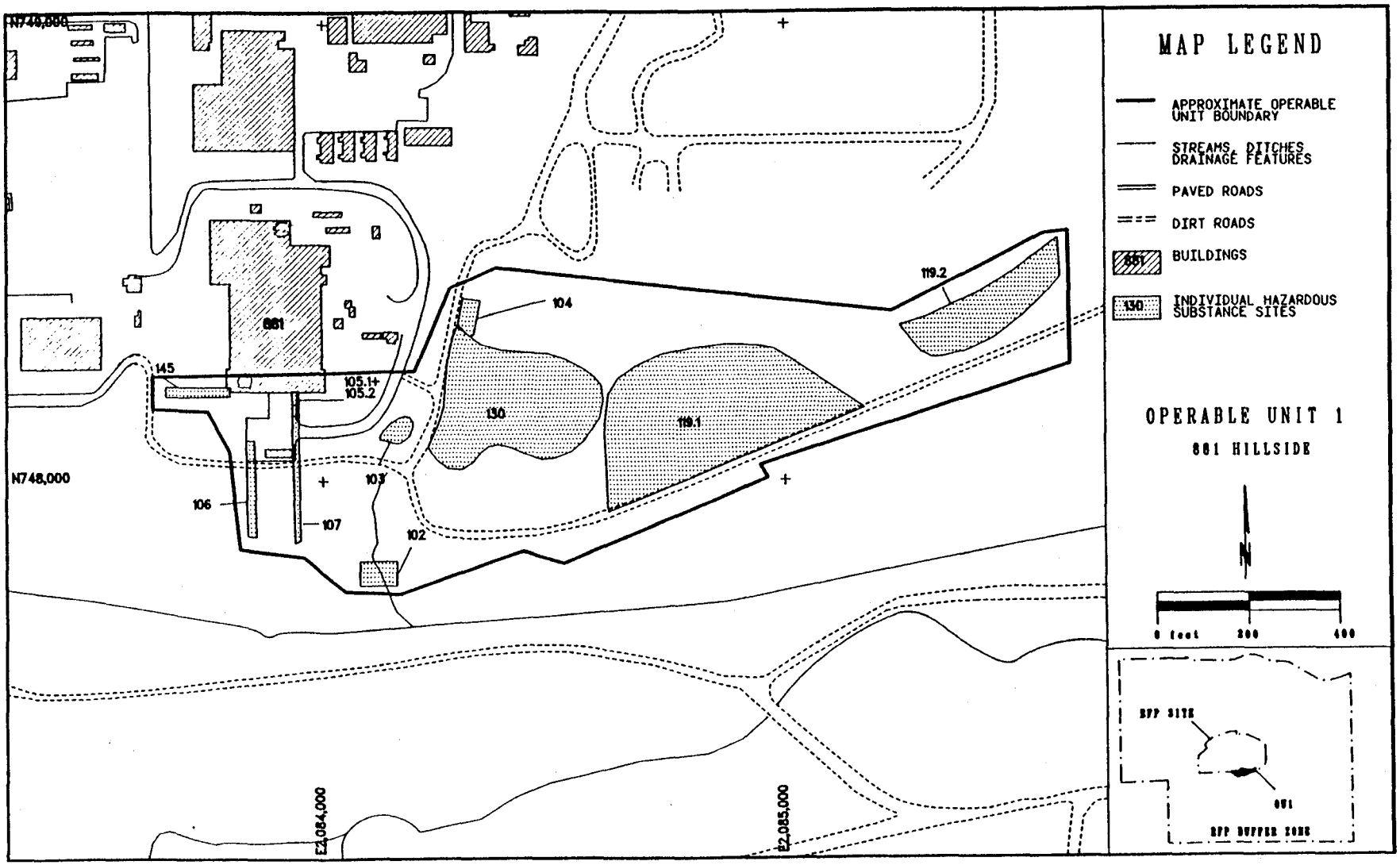
Hours:		
	Monday - Thursday	10:00 a.m. - 9:00 p.m.
	Friday - Saturday	10:00 a.m. - 5:00 p.m.
	Sunday	12:00 noon - 5:00 p.m.

APPENDIX D

OPERABLE UNIT MAPS

INDIVIDUAL HAZARDOUS SUBSTANCE SITES (IHSSs) BY OPERABLE UNIT LISTING

Operable Unit Maps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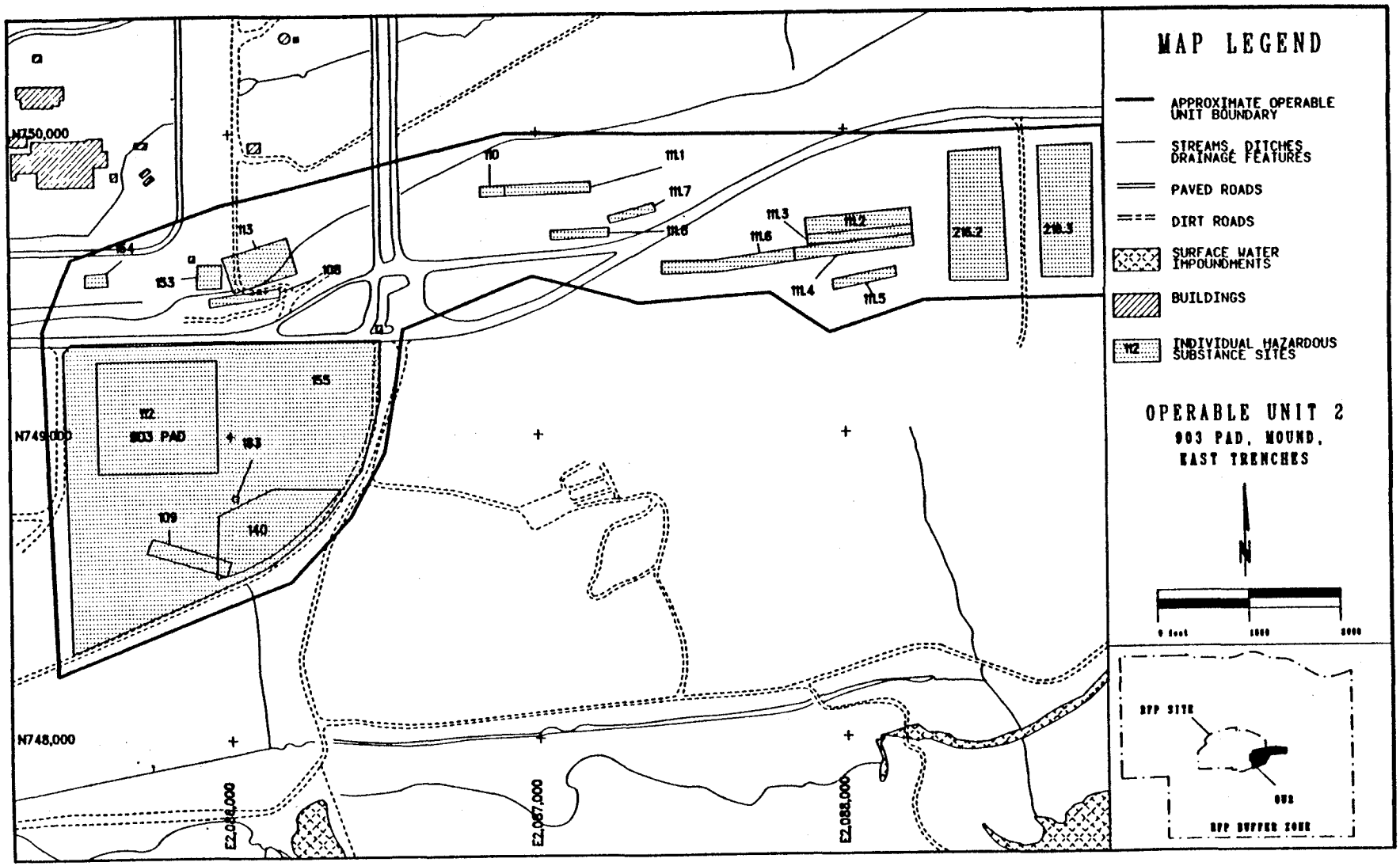
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
881
BUILDINGS
130
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 1
881 HILLSIDE
0 feet
200
400
881
119.2
104
145
105.1+
105.2
130
119.1
N748,000
106
107
103
102
E2,084,000
E2,085,000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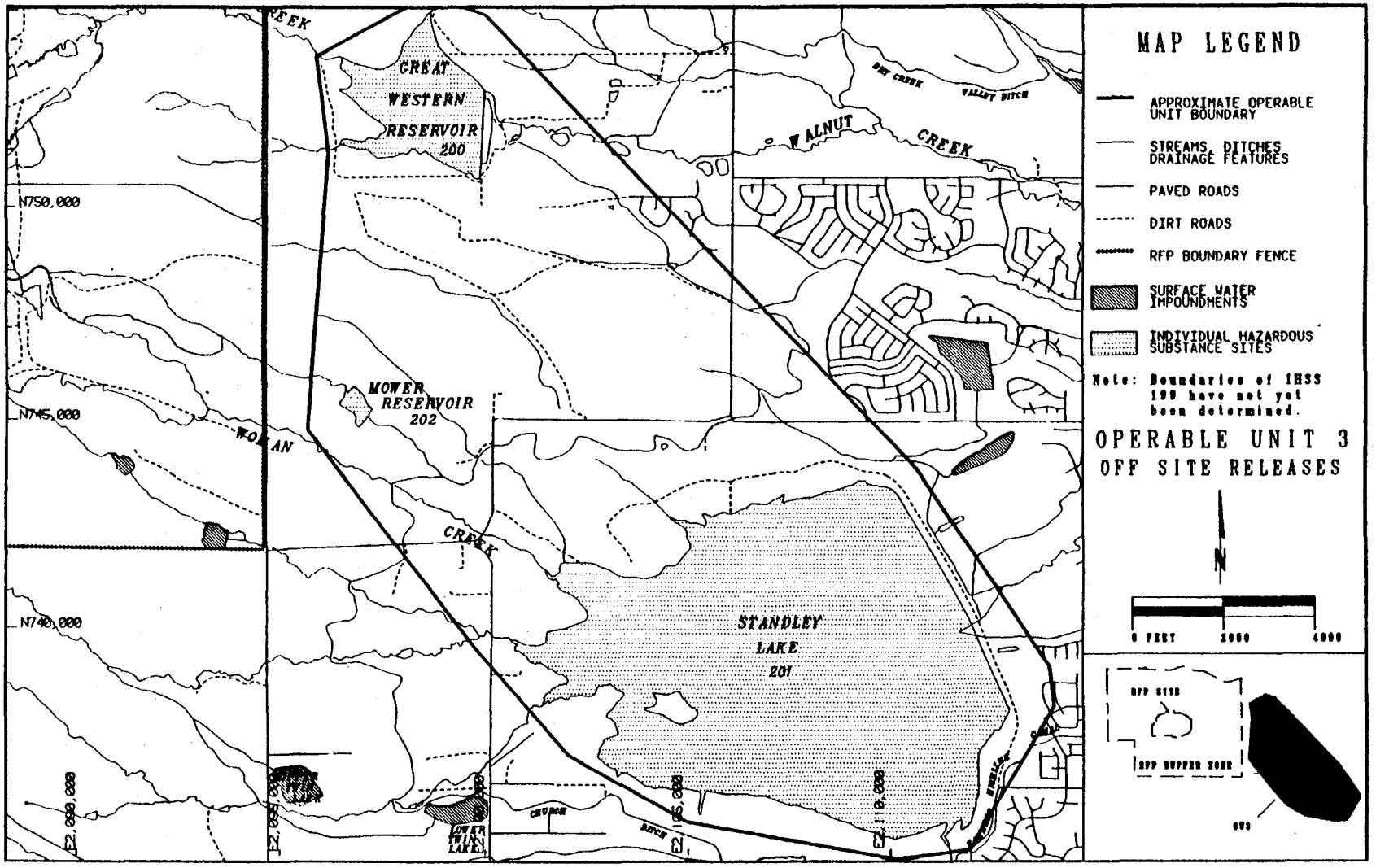
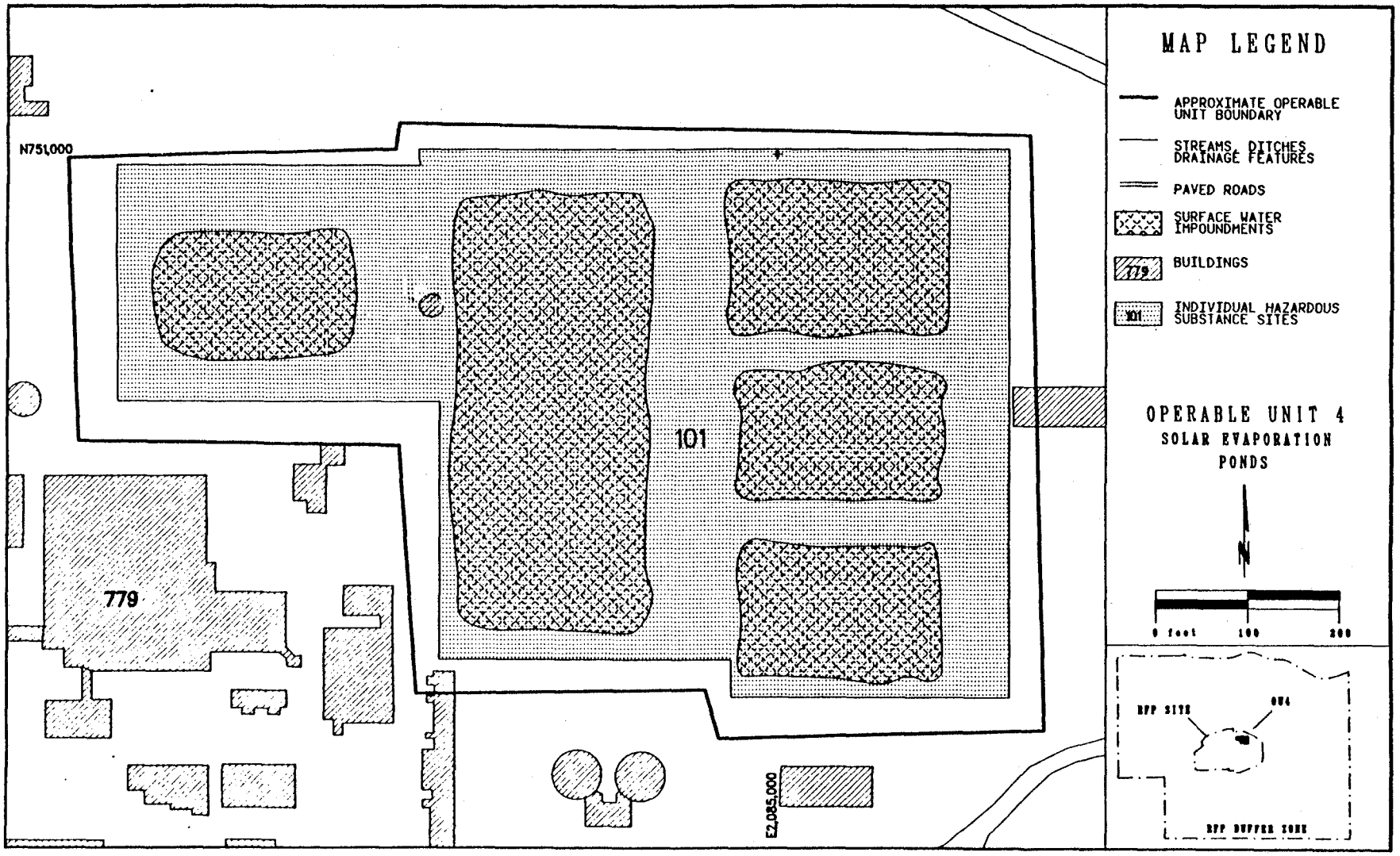
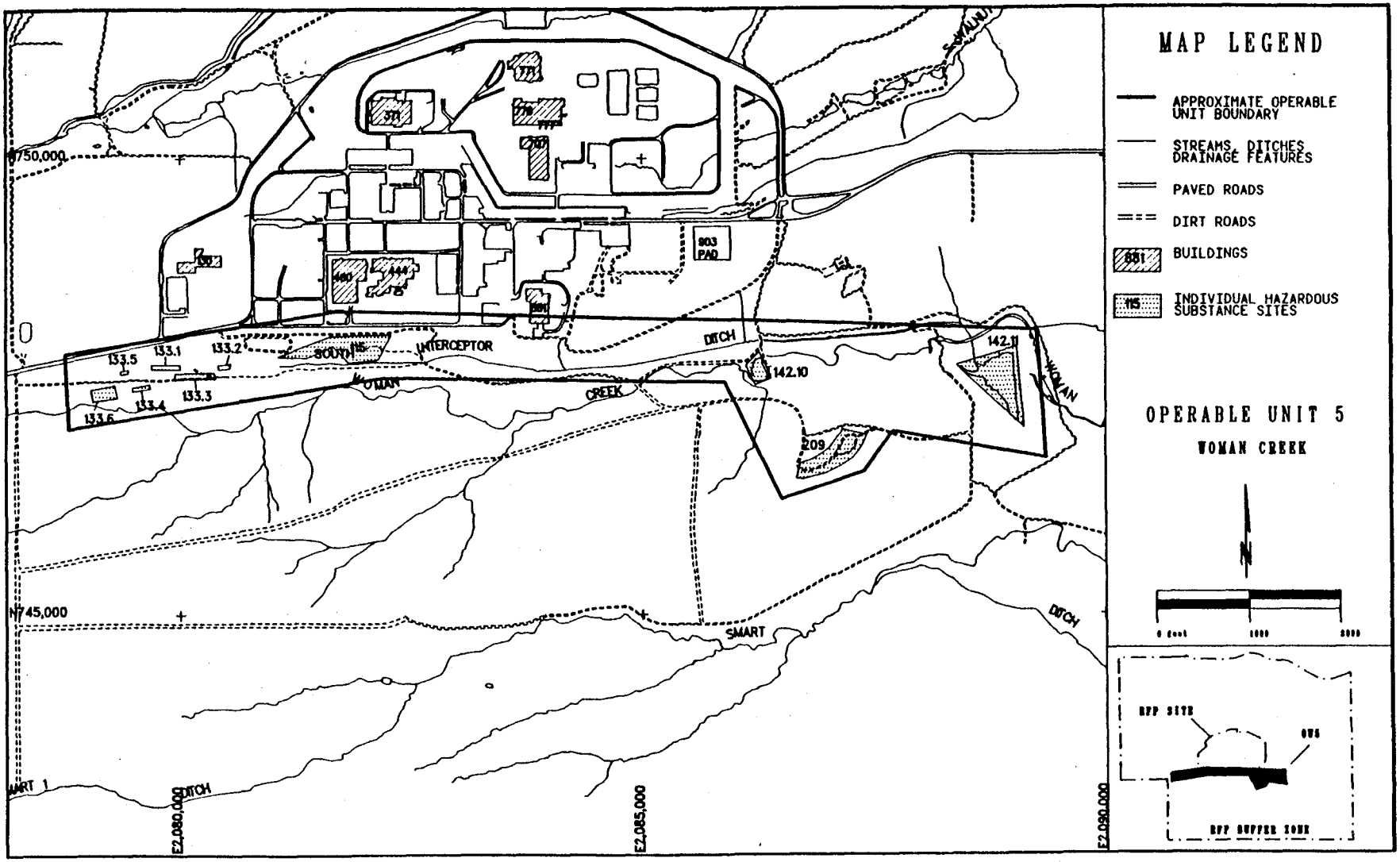
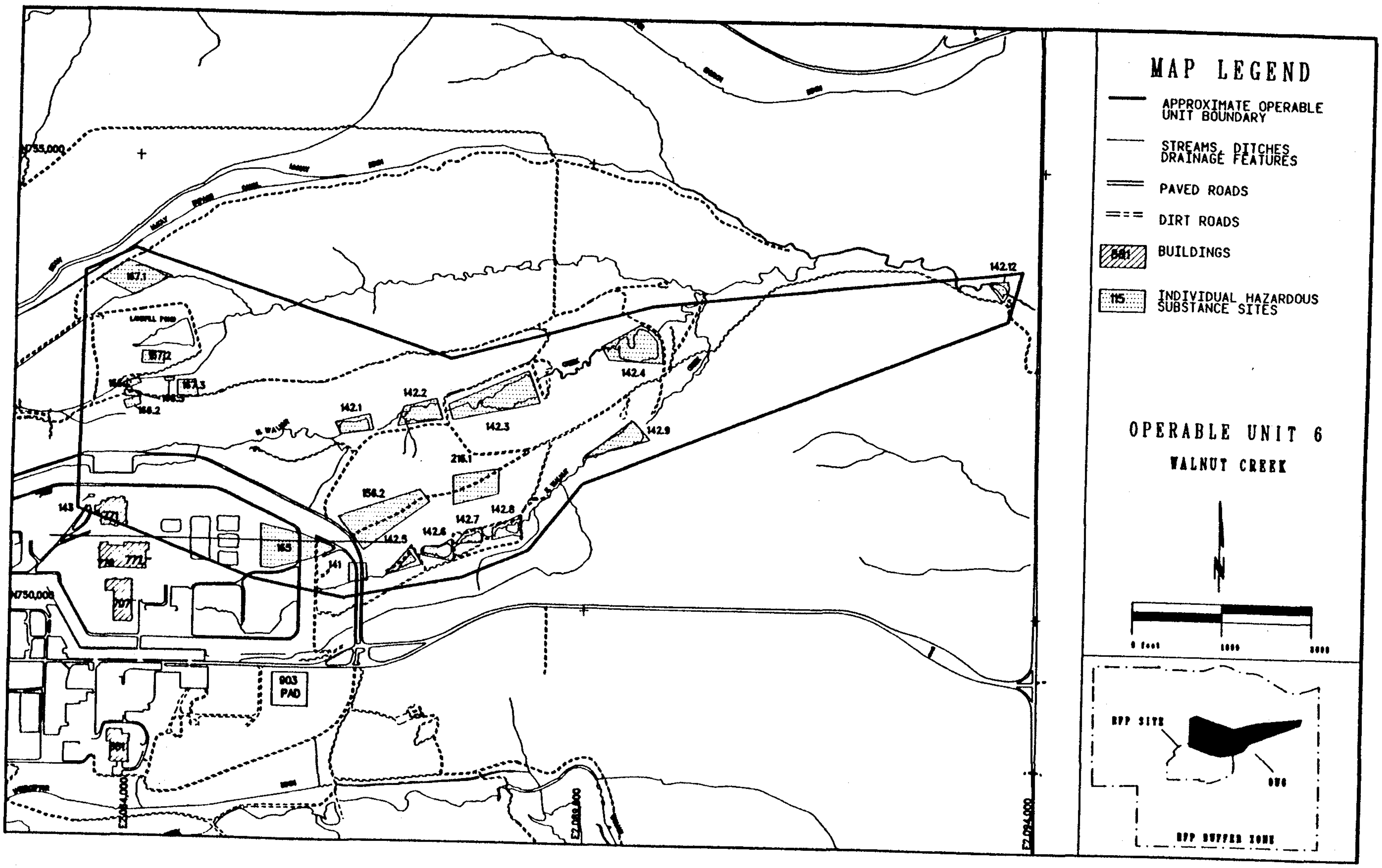
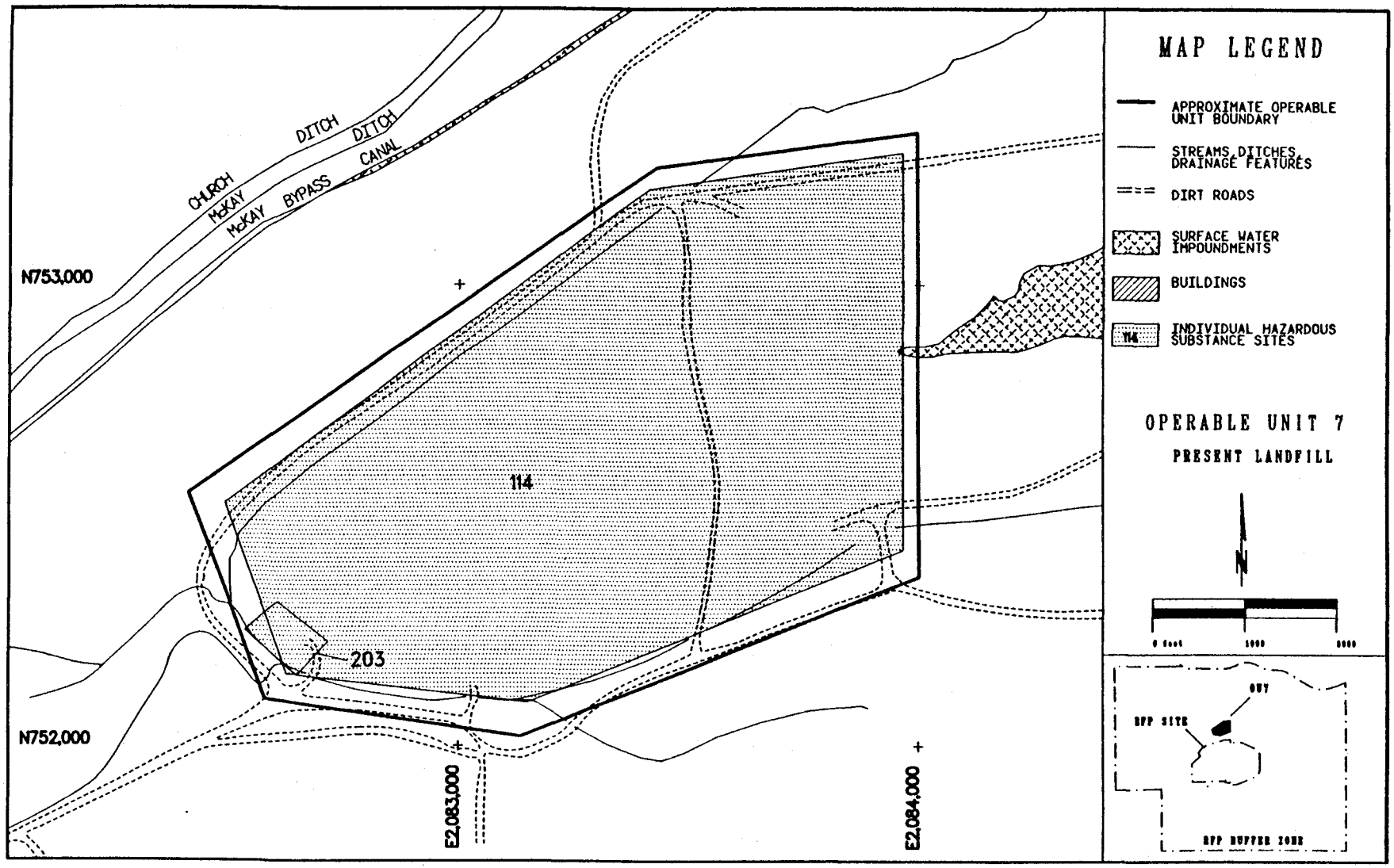
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES, DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE WATER IMPOUNDMENTS
BUILDINGS
112 INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 2
903 PAD, MOUND, EAST TRENCHES
N750,000
N749,000
N748,000
E2,086,000
E2,087,000
E2,088,000
110
111.1
111.7
111.6
111.3
111.2
111.6
111.4
111.5
216.2
216.3
113
114
153
108
112
903 PAD
155
183
109
140
0 feet
1000
2000
RFP SITE
903
RFP BUFFER ZONE

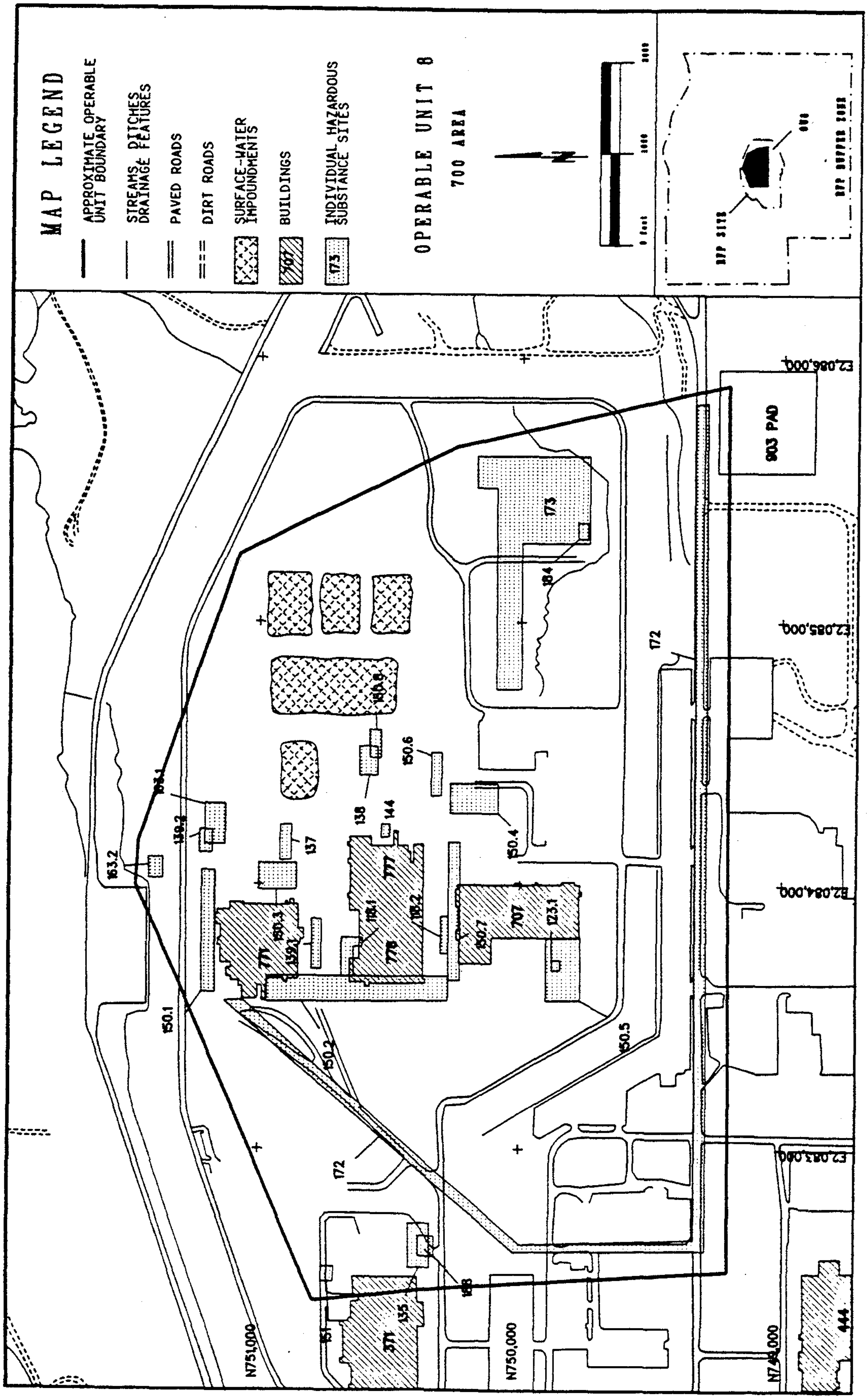

GREAT WESTERN RESERVOIR 200
WALNUT CREEK
DRY CREEK
VALLEY DITCH
MOWER RESERVOIR 202
STANDLEY LAKE 201
N750,000
N745,000
N740,000
E2,095,000
E2,100,000
CHURCH
MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES, DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
RFP BOUNDARY FENCE
SURFACE WATER IMPOUNDMENTS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
Note: Boundaries of IHSS 199 have not yet been determined.
OPERABLE UNIT 3
OFF SITE RELEASES
N
0 FEET
2000
4000
OFF SITE
OFF BUFFER ZONE

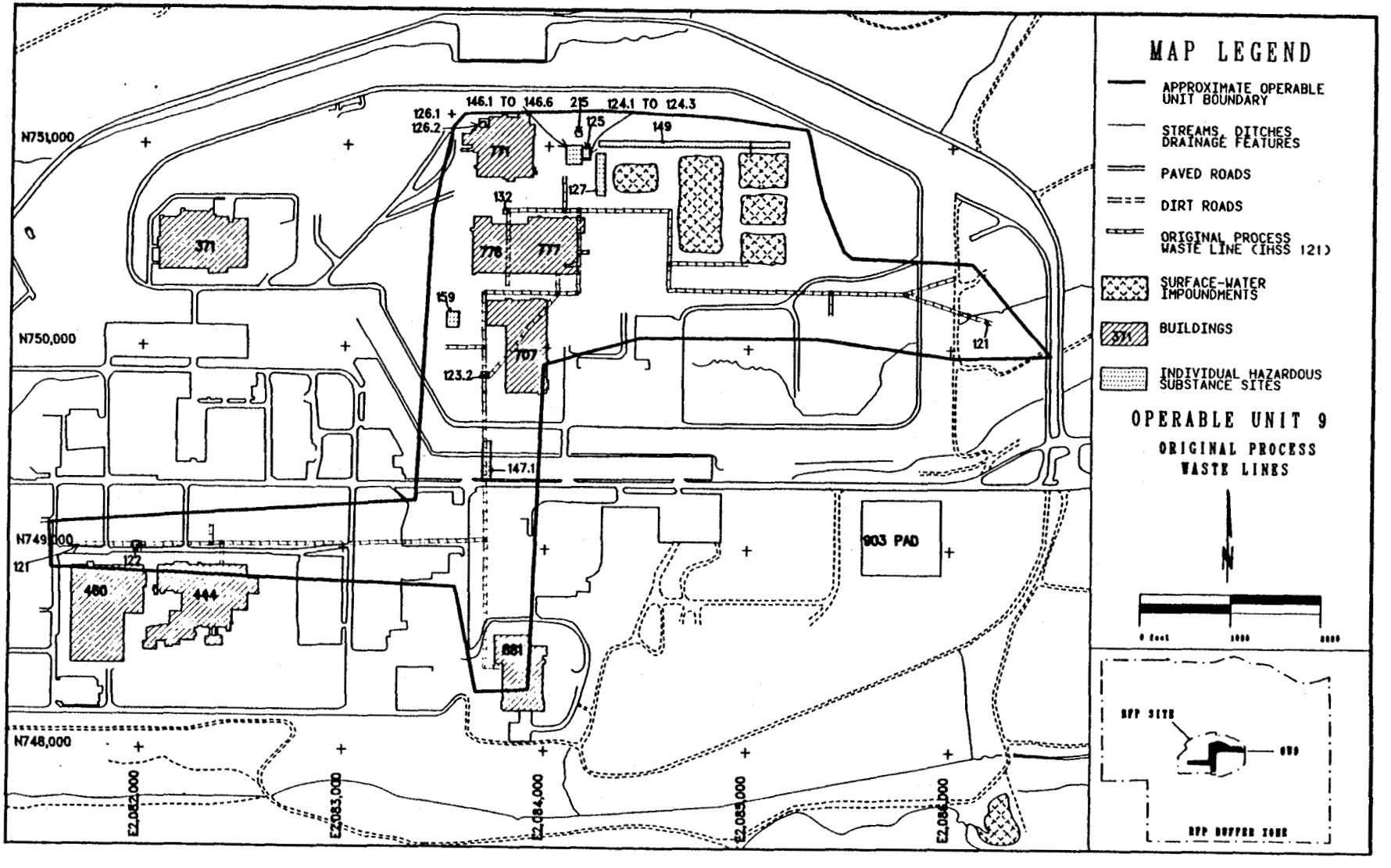

N751,000
779
101
E2,085,000
MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
SURFACE WATER IMPOUNDMENTS
BUILDINGS
779
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
101
OPERABLE UNIT 4
SOLAR EVAPORATION PONDS
N
0 feet
100
200
RFP SITE
OU4
RFP BUFFER ZONE

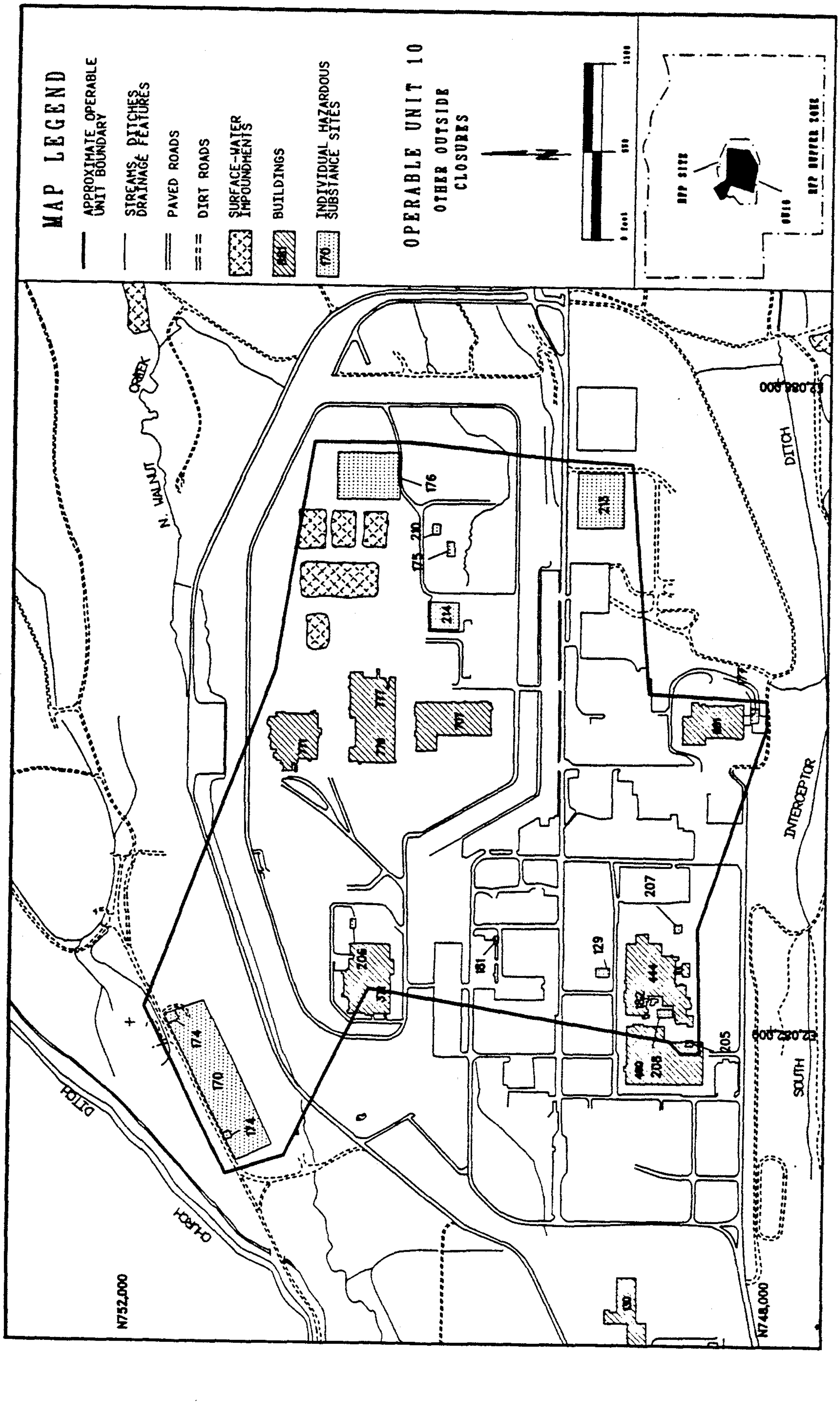

MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 5
WOMAN CREEK
N750,000
N745,000
E2,080,000
E2,085,000
E2,090,000
SOUTH INTERCEPTOR
DITCH
WOMAN CREEK
SMART
903 PAD
142.11
142.10
209
133.5
133.1
133.2
133.6
133.4
133.3
RFP SITE
OU5
RFP BUFFER ZONE

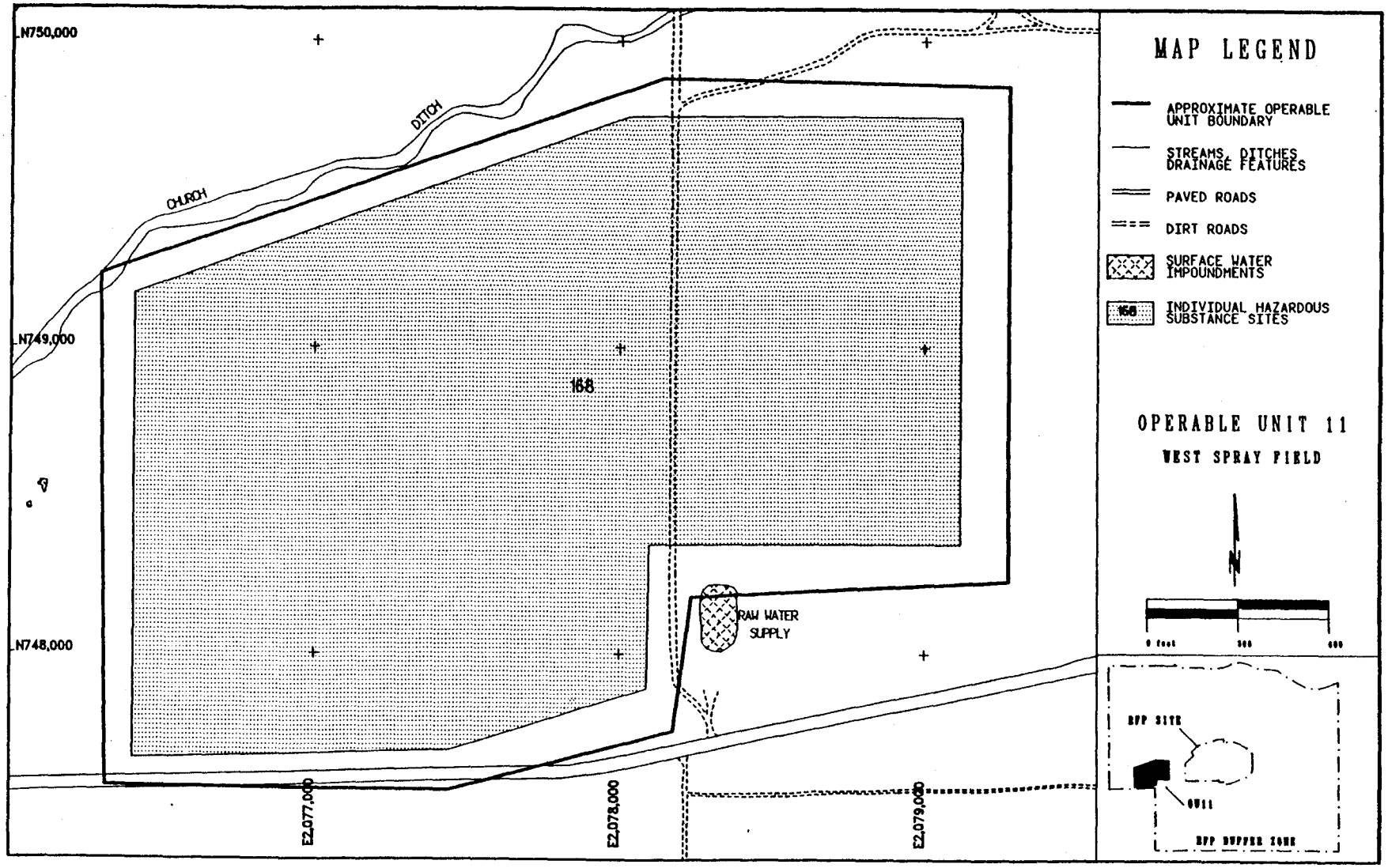

MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 6
WALNUT CREEK
RFP SITE
OU6
RFP BUFFER ZONE
N755,000
N750,000
E2,084,000
E2,089,000
E2,094,000
LANDFILL POND
167.1
167.2
167.3
166.2
166.3
142.1
142.2
142.3
142.4
142.5
142.6
142.7
142.8
142.9
142.12
216.1
156.2
141
143
165
903 PAD
771
707
881

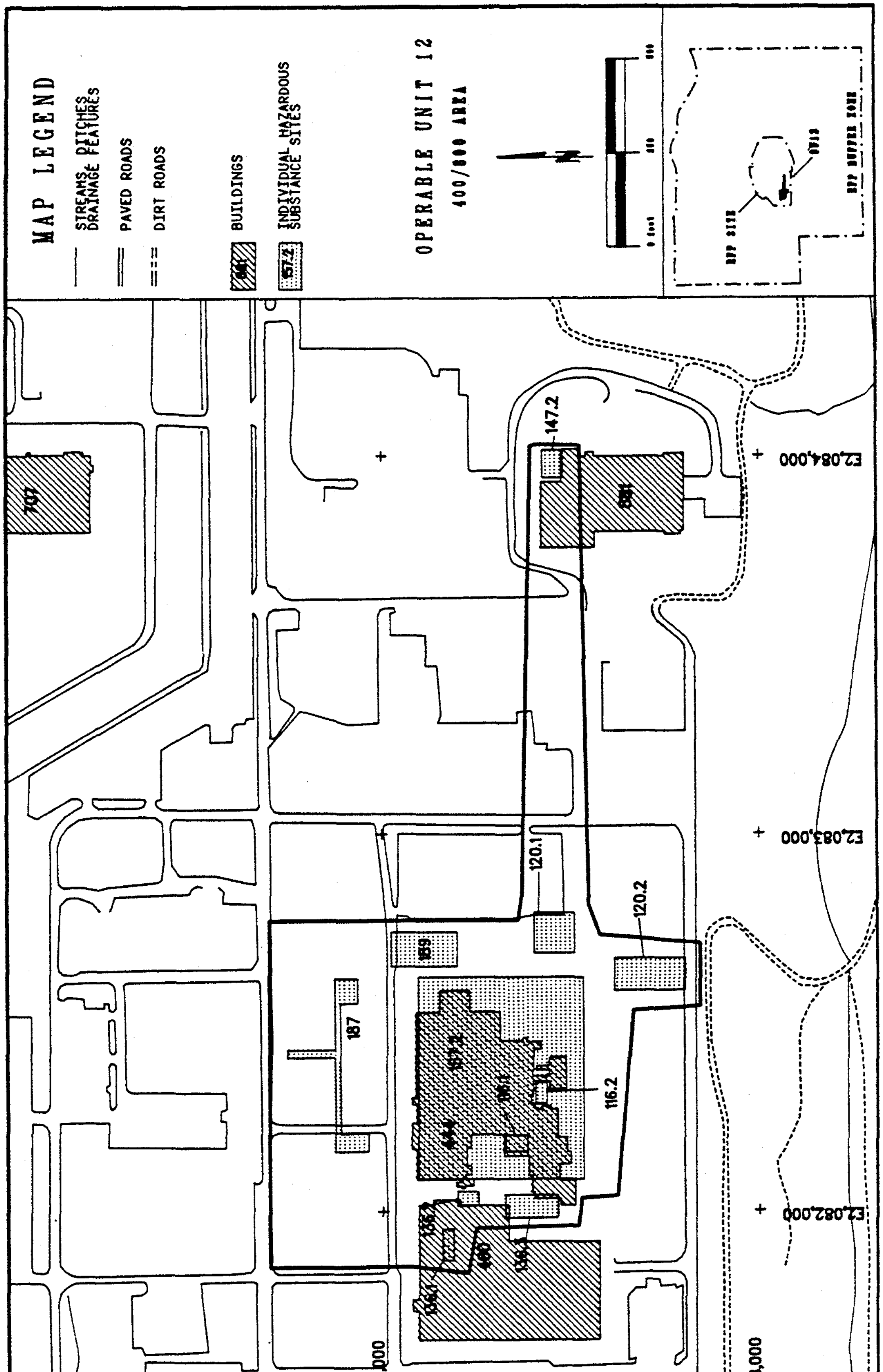

DITCH
DITCH
CHURCH
McKAY
McKAY BYPASS
CANAL
N753,000
N752,000
E2,083,000
E2,084,000
114
203
MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES, DRAINAGE FEATURES
DIRT ROADS
SURFACE WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
114
OPERABLE UNIT 7
PRESENT LANDFILL
OUT
OFF SITE
OFF BUFFER ZONE

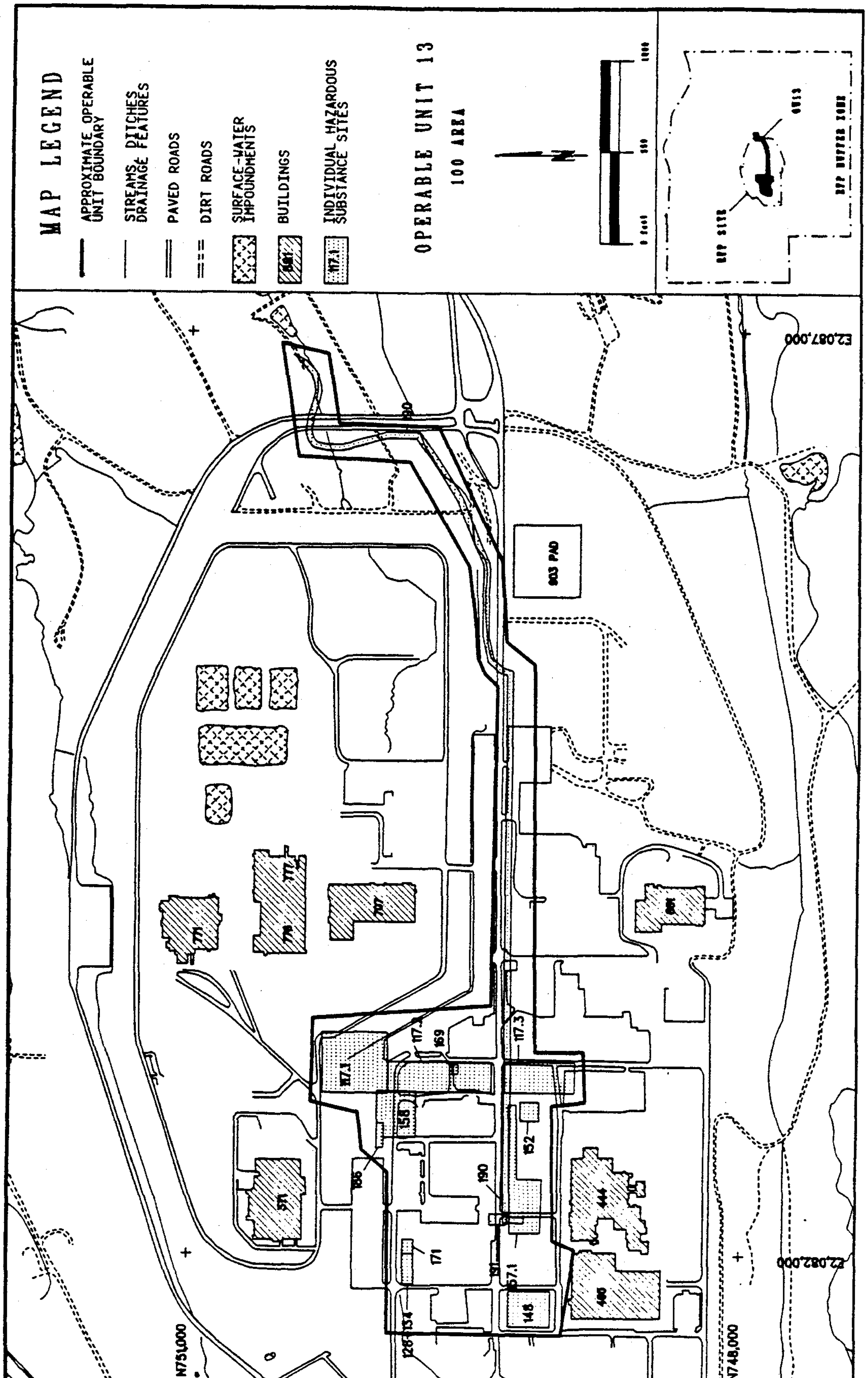

MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 8
700 AREA
903 PAD
173
184
172
150.8
150.6
138
144
150.4
163.1
139.2
163.2
137
150.3
771
139.1
118.1
776
777
118.2
150.7
707
123.1
150.1
150.2
150.5
188
151
371
135
444
E2,086,000
E2,085,000
E2,084,000
E2,083,000
N751,000
N750,000
N749,000

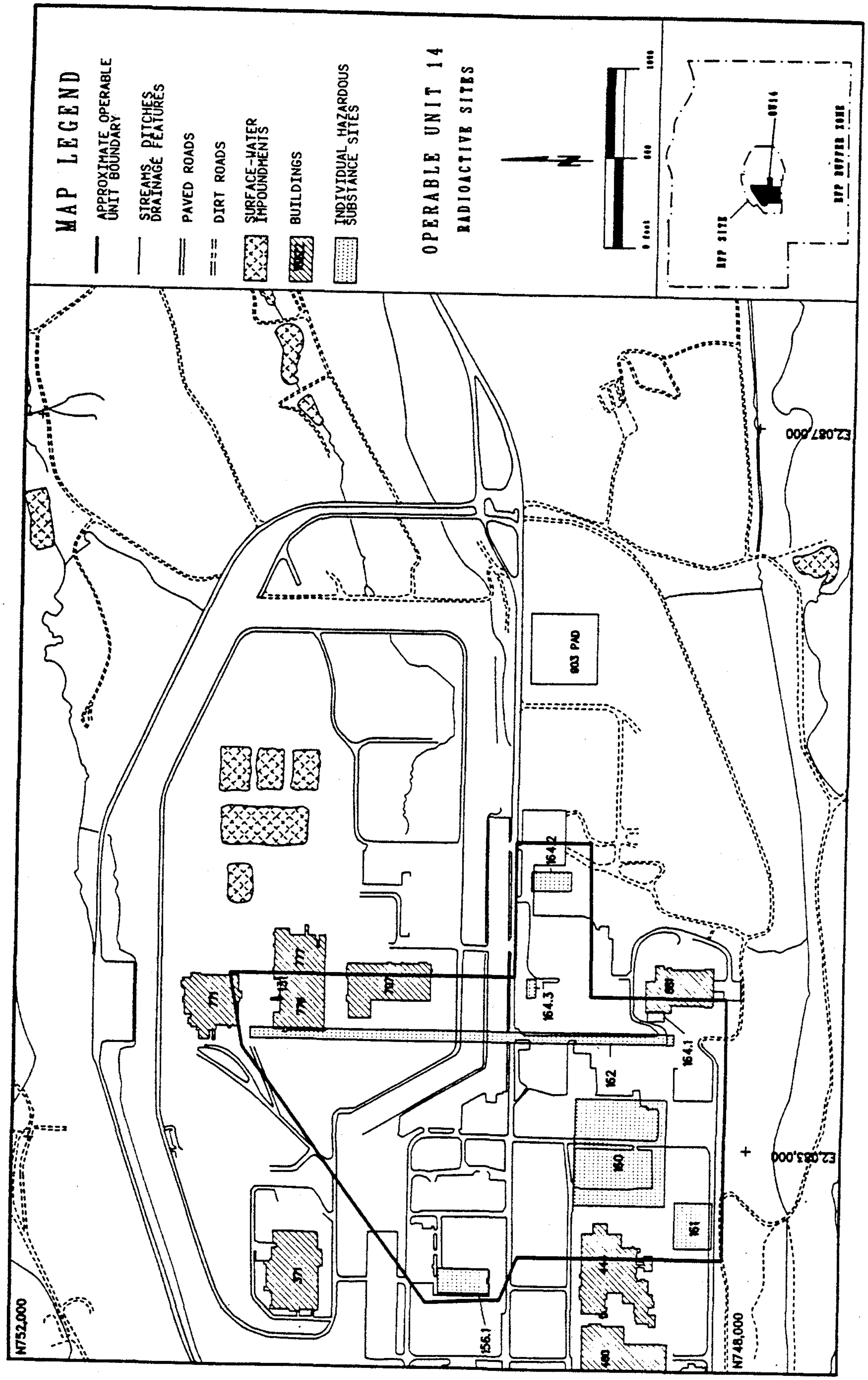

MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
ORIGINAL PROCESS WASTE LINE (IHSS 121)
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 9
ORIGINAL PROCESS WASTE LINES
N
N751,000
N750,000
N749,000
N748,000
E2,082,000
E2,083,000
E2,084,000
E2,085,000
E2,086,000
146.1 TO 146.6
215
124.1 TO 124.3
126.1
126.2
125
149
127
132
159
123.2
147.1
121
122
771
776
777
707
371
480
444
881
903 PAD
RFP SITE
RFP BUFFER ZONE

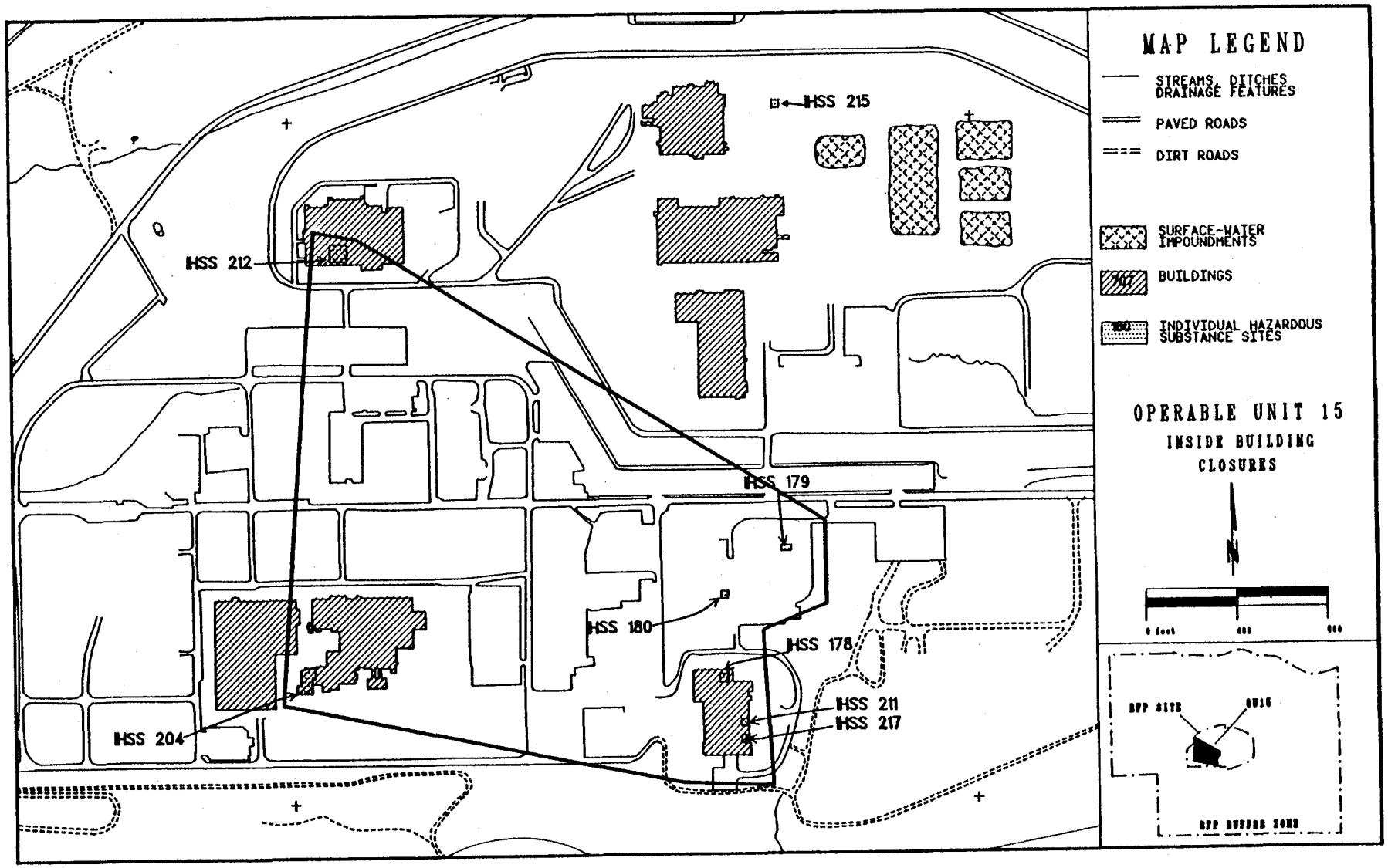

MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES, DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
170
OPERABLE UNIT 10
OTHER OUTSIDE CLOSURES
N. WALNUT CREEK
DITCH
INTERCEPTOR
SOUTH
CHURCH
176
215
210
175
214
174
170
206
181
129
207
444
205
208
N752,000
N748,000
E2,086,000
E2,082,000

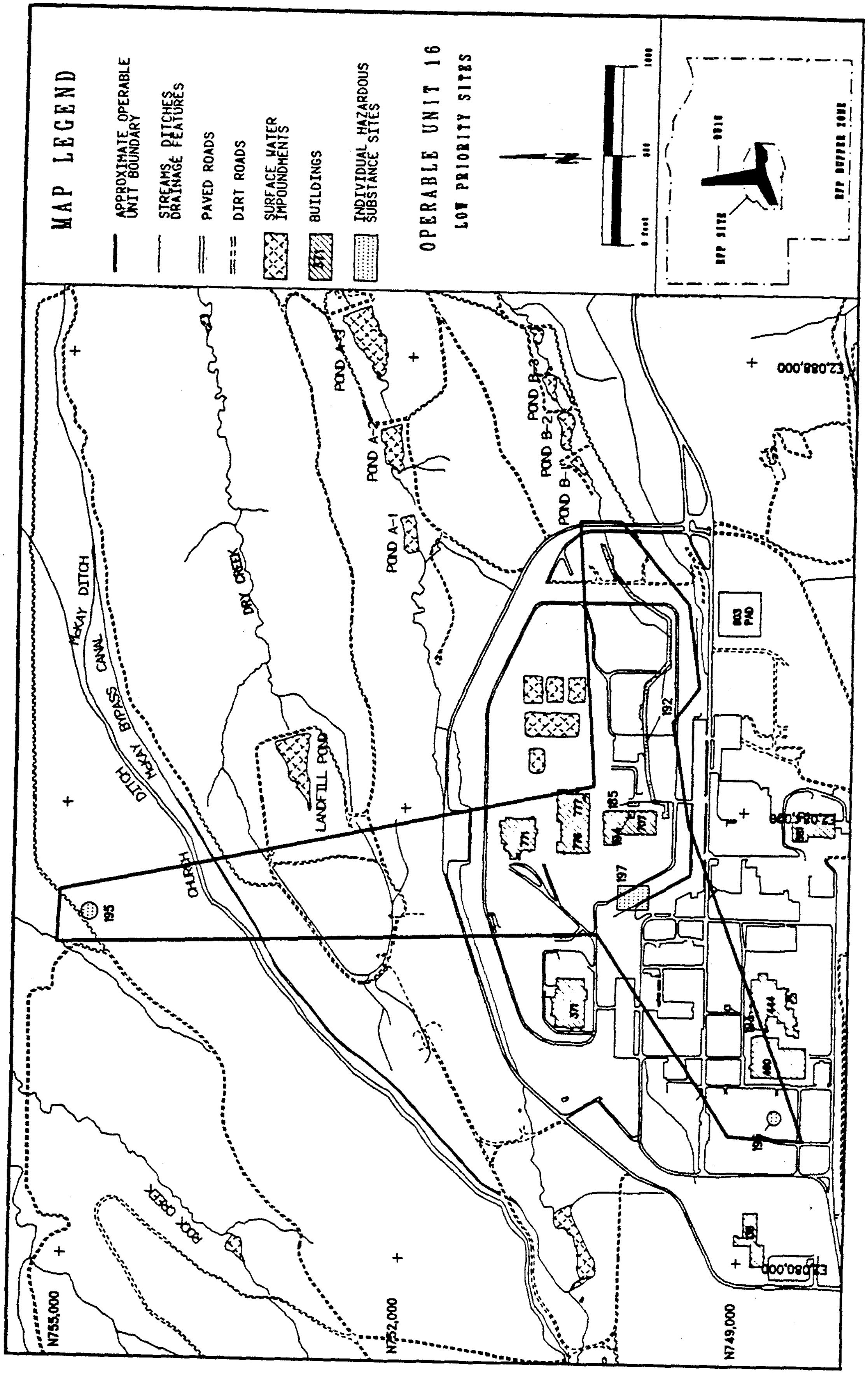

N750,000
N749,000
N748,000
E2,077,000
E2,078,000
E2,079,000
DITCH
CHURCH
168
RAW WATER SUPPLY
MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE WATER IMPOUNDMENTS
168
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 11
WEST SPRAY FIELD
N
0 feet
300
600
RFP SITE
WELL
RFP BUFFER ZONE


MAP LEGEND
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 12
400/800 AREA
RFP SITE
OU12
RFP BUFFER ZONE
707
881
147.2
120.1
120.2
159
187
157.2
116.2
136.1
136.2
136.3
460
E2,084,000
E2,083,000
E2,082,000
N749,000
N748,000


MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES, DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
117.1
OPERABLE UNIT 13
100 AREA
903 PAD
771
776
777
707
371
444
460
148
117.1
117.2
117.3
169
158
152
186
190
171
191
157.1
134
126
N751,000
N748,000
E2,082,000
E2,087,000


MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 14
RADIOACTIVE SITES
903 PAD
164.2
164.3
164.1
162
160
161
156.1
771
776
777
707
881
371
444
460
N752,000
N748,000
E2,083,000
E2,087,000
RFP SITE
RFP BUFFER ZONE


MAP LEGEND
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE-WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 15
INSIDE BUILDING CLOSURES
HSS 215
HSS 212
HSS 179
HSS 180
HSS 178
HSS 211
HSS 217
HSS 204


MAP LEGEND
APPROXIMATE OPERABLE UNIT BOUNDARY
STREAMS, DITCHES DRAINAGE FEATURES
PAVED ROADS
DIRT ROADS
SURFACE WATER IMPOUNDMENTS
BUILDINGS
INDIVIDUAL HAZARDOUS SUBSTANCE SITES
OPERABLE UNIT 16
LOW PRIORITY SITES
RFP SITE
RFP BUFFER ZONE
POND A-1
POND A-2
POND A-3
POND B-1
POND B-2
POND B-3
DRY CREEK
McKAY DITCH
McKAY BYPASS CANAL
CHURCH DITCH
LANDFILL POND
ROCK CREEK
195
197
192
185
903 PAD
N755,000
N752,000
N749,000
E2,088,000
E2,084,000
E2,080,000

Individual Hazardous Substance Sites (IHSSs) by Operable Unit Listing

Individual Hazardous Substance Sites (IHSSs) by Operable Unit Listing

Operable Unit	IHSS No.	IHSS Name
OU 1 881 Hillside	102	Oil Sludge Pit
	103	Chemical Burial Area
	104	Liquid Dumping Pit
	105.1	Out-of-Service Fuel Tank - West Tank
	105.2	Out-of-Service Fuel Tank - East Tank
	106	Outfall
	107	Hillside Oil Leak
	119.1	Multiple Solvent Spills - West Area
	119.2	Multiple Solvent Spills - East Area
	130	Radioactive Site - 800 Area Site #1
	145	Sanitary Waste Line Leak
OU 2 903 Pad, Mound, and East Trenches	108	Trench T-1
	109	Trench T-2
	110	Trench T-3
	111.1	Trench T-4
	111.2	Trench T-5
	111.3	Trench T-6
	111.4	Trench T-7
	111.5	Trench T-8
	111.6	Trench T-9
	111.7	Trench T-10

Operable Unit	IHSS No.	IHSS Name
	111.8	Trench T-11
	112	903 Drum Storage Area
	113	Mound Area
	140	Reactive Metal Destruction Site
	153	Oil Burn Pit #2
	154	Pallet Burn Site
	155	903 Lip Area
	183	Gas Detoxification Area
	216.2	East Spray Field - Center Area
	216.3	East Spray Field - South Area
OU 3 Offsite Releases	199	Contamination of Land Surface
	200	Great Western Reservoir
	201	Standley Lake
	202	Mower Reservoir
OU 4 Solar Evaporation Ponds	101	207 Solar Evaporation Ponds
OU 5 Woman Creek	115	Original Landfill
	133.1	Ash Pit 1-1
	133.2	Ash Pit 1-2
	133.3	Ash Pit 1-3
	133.4	Ash Pit 1-4
	133.5	Incinerator

Operable Unit	IHSS No.	IHSS Name
	133.6	Concrete Wash Pad
	142.10	Retention Pond C-1
	142.11	Retention Pond C-2
	209	Surface Disturbance SE of Bldg. 881
OU 6 Walnut Creek	141	Sludge Dispersal
	142.1	Retention Pond A-1
	142.2	Retention Pond A-2
	142.3	Retention Pond A-3
	142.4	Retention Pond A-4
	142.5	Retention Pond B-1
	142.6	Retention Pond B-2
	142.7	Retention Pond B-3
	142.8	Retention Pond B-4
	142.9	Retention Pond B-5
	142.12	Retention Pond A-5
	143	Old Outfall
	156.2	Soil Dump Area
	165	Triangle Area
	166.1	Trench A
	166.2	Trench B
	166.3	Trench C

Operable Unit	IHSS No.	IHSS Name
	167.1	Spray Fields - North Area
	167.2	Spray Fields - Pond Area
	167.3	Spray Field - South Area
	216.1	East Spray Field - North Area
OU 7 Present Landfill	114	Present Landfill
	203	Inactive Hazardous Waste Storage Area
OU 8 700 Area	118.1	Multiple Solvent Spills - West of Bldg. 730
	118.2	Multiple Solvent Spills - South of Bldg. 776
	123.1	Valve Vault
	135	Cooling Tower Blowdown
	137	Cooling Tower Blowdown - Bldg. 774
	138	Cooling Tower Blowdown - Bldg. 779
	139.1	Caustic/Acid Spills - Hydroxide Acid Tanks
	139.2	Caustic/Acid Spill - Hydrofluoric Acid Tanks
	144	Sewer Line Break
	150.1	Radioactive Liquid Leaks - North of Bldg. 771
	150.2	Radioactive Liquid Leaks - West of Bldg. 771
	150.3	Radioactive Liquid Leaks - Between Bldg. 771 and 774

Operable Unit	IHSS No.	IHSS Name
	150.4	Radioactive Liquid Leaks - East of Bldg. 750
	150.5	Radioactive Liquid Leaks - West of Bldg. 707
	150.6	Radioactive Liquid Leaks - South of Bldg. 779
	150.7	Radioactive Liquid Leaks - South of Bldg. 776
	150.8	Radioactive Liquid Leaks - NE of Bldg. 779
	151	Fuel Oil Leak
	163.1	Radioactive Site - 700 Area Site #2 Wash Area
	163.2	Radioactive Site - 700 Area Site #3 Wash Area
	172	Central Avenue Waste Spill
	173	Radioactive Site - 900 Area
	184	Bldg. 991 Steam Cleaning Area
	188	Acid Leak
OU 9 Original Process Waste Lines	121	Original Process Waste Lines
	122	Underground Concrete Tank
	123.2	Valve Vault West of Bldg. 707
	124.1	Radioactive Liquid Waste Storage Tank - 30,000-Gallon Tank (#68)
	124.2	Radioactive Liquid Waste Storage Tank - 14,000-Gallon Tank (#66)

Operable Unit	IHSS No.	IHSS Name
	124.3	Radioactive Liquid Waste Storage Tank - 14,000-Gallon Tank (#67)
	125	Holding Tank
	126.1	Out-of-Service Process Waste Tanks - Westernmost Tank
	126.2	Out-of-Service Process Waste Tanks - Easternmost Tank
	127	Low-Level Radioactive Waste Leak
	132	Radioactive Site - 700 Area Site #4
	146.1	Concrete Process Waste Tanks - 7,500-Gallon Tank (#31)
	146.2	Concrete Process Waste Tanks - 7,500-Gallon Tank (#32)
	146.3	Concrete Process Waste Tanks - 7,500-Gallon Tank (#34W)
	146.4	Concrete Process Waste Tanks - 7,500-Gallon Tank (#34E)
	146.5	Concrete Process Waste Tanks - 3,750-Gallon Tank (#30)
	146.6	Concrete Process Waste Tanks - 3,750-Gallon Tank (#33)
	147.1	Process Waste Leaks - Maas Area
	149	Effluent Pipe
	159	Radioactive Site - Bldg. 559
	215	Units 55.13, 55.14, 55.15, 55.16 - Tanks T-40, T-66, T-67, T-68

Operable Unit	IHSS No.	IHSS Name
OU 10 Other Outside Closures	129	Oil Leak
	170	PU&D Storage Yard - Waste Spills
	174	PU&D Container Storage Facilities (2)
	175	S&W Bldg. 980 Container Storage Facility
	176	S&W Contractor Storage Yard
	177	Bldg. 885 Drum Storage Area
	181	Bldg. 334 Cargo Container Area
	182	Bldg. 444/453 Drum Storage Area
	205	Bldg. 460 Sump #3 Acid Side
	206	Inactive D-836 Hazardous Waste Tank
	207	Inactive 444 Acid Dumpster
	208	Inactive 444/447 Waste Storage Area
	210	Unit 16, Bldg. 980 Cargo Container
	213	Unit 15, 904 Pad Pondcrete Storage
	214	Unit 25, 750 Pad Pondcrete and Saltcrete Storage
OU 11 West Spray Field	168	West Spray Field
OU 12 400/800 Area	116.1	Multiple Solvent Spills - West Loading 400/800 Area Dock Area
	116.2	Multiple Solvent Spills - South Loading Dock Area

Operable Unit	IHSS No.	IHSS Name
	120.1	Fiberglassing Area - North of Bldg. 664
	120.2	Fiberglassing Area - West of Bldg. 664
	136.1	Cooling Tower Ponds - NE Corner of Bldg. 460
	136.2	Cooling Tower Ponds - West of Bldg. 460
	136.3	Cooling Tower Ponds - South of Bldg. 460, West of Bldg. 779
	147.2	Process Waste Leaks - Owen Area
	157.2	Radioactive Site - South Area
	187	Acid Leaks (2)
	189	Multiple Acid Spills
OU 13 100 Area	117.1	Chemical Storage - North Site
	117.2	Chemical Storage - Middle Site
	117.3	Chemical Storage - South Site
	128	Oil Burn Pit No. 1
	134	Lithium Metal Destruction Site
	148	Waste Spills
	152	Fuel Oil Leak
	157.1	Radioactive Site - North Area
	158	Radioactive Site - Bldg. 551
	169	Waste Drum Peroxide Burial
	171	Solvent Burning Ground

Operable Unit	IHSS No.	IHSS Name
	186	Valve Vault 12
	190	Caustic Leak
	191	Hydrogen Peroxide Spill
OU 14 Radioactive Sites	131	Radioactive Site - 700 Area Site #1
	156.1	Radioactive Soil Burial - Bldg. 334 Parking Lot
	160	Radioactive Site - Bldg. 444 Parking Lot
	161	Radioactive Site - Bldg. 664
	162	Radioactive Site - Bldg. 700 Area Site #2
	164.1	Radioactive Site - 800 Area Site #2, Concrete Slab
	164.2	Radioactive Site - 800 Area Site #2, Bldg. 886 Spills
	164.3	Radioactive Site - 800 Area Site #2, Bldg. 889 Storage Pad
OU 15 Inside Building Closures	178	Bldg. 881 Drum Storage Area
	179	Bldg. 865 Drum Storage Area
	180	Bldg. 883 Drum Storage Area
	204	Original Uranium Chip Roaster
	211	Unit 26, Bldg. 881 Drum Storage

Operable Unit	IHSS No.	IHSS Name
	212	Unit 63, Bldg. 371 Drum Storage
	217	Unit 32, Bldg. 881, CN Bench Scale Treatment
OU 16 Low-Priority Sites	185	Solvent Spill
	192	Antifreeze Discharge
	193	Steam Condensate Leak
	194	Steam Condensate Leak
	195	Nickel Carbonyl Disposal
	196	Water Treatment Plant Backwash Pond
	197	Scrap Metal Sites

APPENDIX E

FEDERAL, STATE, AND LOCAL REGULATORY REQUIREMENTS AND ACCEPTANCE CRITERIA

FEDERAL, STATE, AND LOCAL REGULATORY REQUIREMENTS AND ACCEPTANCE CRITERIA

One of the principal Rocky Flats goals is compliance with all applicable environmental regulations and conditions set by federal, state, and local regulatory authorities. Many of the activities in the SSP are specifically needed to achieve or maintain compliance. Some of the regulations and associated permits that may affect environmental restoration and waste management activities and a brief discussion of the goals and objectives of each regulation are summarized below. Waste acceptance criteria promulgated by the Waste Isolation Pilot Plant and the Nevada Test Site are also listed.

Federal and Related State Statutes

- Antiquities Act - The Antiquities Act provides for protection of historic remains and monuments on federal lands by establishing penalties for destroying historic ruins on public lands.

- Archaeological Resources Protection Act - The Archaeological Resources Protection Act requires that a permit from the Federal Land Manager (Department of Interior) be obtained before excavating and removing archaeological resources from public lands.

- Bald and Golden Eagle Protection Act - The Bald and Golden Eagle Protection Act affords protection to bald eagles and golden eagles by establishing penalties for unauthorized taking, possession, selling, purchase, or transport of eagles, their nests, or their eggs. Permits may be issued for taking or distributing eagles or their nests for certain purposes.

- Clean Air Act - The Clean Air Act provides the statutory basis for regulating contaminant materials entering the atmosphere. The Act places most of the responsibility on states to achieve compliance with air quality standards. Regulation is achieved through development and implementation of regional air quality control programs, and each state is required to establish and enforce primary and secondary air quality standards. The State of Colorado has complied with the federal requirements by passing and implementing the Colorado Air Quality Control Act. The Colorado Air Quality Control Act resulted in the creation of two administrative organizations: (1) the Colorado Air Quality Control Commission and (2) the Colorado Air Pollution Control Division. The Commission consists of Colorado citizens appointed by the Governor and is charged with directing policy and developing regulatory standards. The Air Pollution Control Division of CDH administers and enforces air quality programs adopted by the Commission.

  The Clean Air Act and the Colorado Air Quality Control Act include requirements for notification, recordkeeping, performance testing, and monitoring for new stationary sources. In addition, Colorado requires submittal of APENs

for all emissions of hazardous, criteria, or toxic air pollutants, with exceptions for sources of minor significance.

The Clean Air Act Amendments of 1990 were signed into law on November 15, 1990. Many of the new regulatory requirements will not be in full effect for 10 or 20 years (or more). The amendments include principal features regarding nonattainment areas, auto standards/clean fuels, air toxics, acid rain, chlorofluorocarbons, permit requirements, and strengthening of enforcement. A list of 189 hazardous air pollutants is set forth in the amendments, as are requirements for EPA to promulgate new control standards for most sources of such emissions.

Compliance with the Clean Air Act for Rocky Flats consists primarily of monitoring emission sources to document compliance with emissions standards and permits.

- Federal Water Pollution Control Act (Clean Water Act) - This Act provides the statutory basis for regulating the discharge of pollutants into the waters of the United States. Colorado waters are regulated by both federal law and the Colorado Water Quality Control Act. These regulations control direct discharge to oceans or surface waters (including wetlands), discharges of dredged or fill material in waters of the United States, and indirect discharges to publicly owned treatment works.

  The Clean Water Act requires permits for discharges from point sources under NPDES. EPA has approved the CDH NPDES program for implementation defined by the Colorado Water Quality Control Act. This act created two administrative organizations: (1) the Colorado Water Quality Control Commission, with primary responsibility for setting water quality standards, regulations, and state water classifications; and (2) the Colorado Water Quality Control Division, with responsibility for standards enforcement, permit administration, and criminal prosecution of violators. The Colorado program expands the federal definition of surface waters to include all surface and subsurface waters.

  For Rocky Flats, demonstrating compliance with the Clean Water Act consists primarily of monitoring point-source and storm water discharges to document compliance with NPDES permits.

  The Clean Water Act authorizes EPA to issue regulations governing disposal of sewage sludge. NPDES permits are required for disposal of sewage sludge that could result in any pollutant entering navigable waters.

- Comprehensive Environmental Response, Compensation and Liability Act - CERCLA provides the statutory basis for identifying, evaluating, and remediating sites where hazardous substances have been released or pose a substantial threat of release. Title III of the Superfund Amendments and Reauthorization Act

(SARA Title III) has been codified as a separate legislative program and is covered under the Emergency Planning and Community Right-to-Know Act (EPCRA).

The remaining sections of CERCLA established the requirements for spill reporting, site remediation, and long-term post-remediation monitoring. The requirements for spill reporting are included in the response plan prepared by the organization responsible for the hazardous or toxic chemical.

CERCLA and SARA govern Superfund investigative and remedial activities at abandoned or inactive hazardous waste sites. Rocky Flats was added to the Superfund National Priorities List in 1989, where CERCLA sites are grouped according to location and potential health risk.

CERCLA also includes provisions for establishment of a Toxic Substances and Disease Registry under Section 104(i). This provision establishes appropriate disease/exposure registries; provides for medical care and testing of exposed individuals in cases of public health emergencies; and provides for development, maintenance, and dissemination of information on health effects of toxic substances. The registry also contains a list of areas restricted or closed because of toxic substances contamination; publishes research regarding relationships between exposure to toxic substances and illness; and provides for health assessments at all sites on the National Priorities List and health assessments in response to a petition.

- Emergency Planning and Community Right-to-Know Act - This Act is the free-standing statute resulting from SARA Title III requirements. It encourages and supports community planning efforts at the state and local levels and provides citizens and local governments with information regarding chemical hazards present in the community.

  EPCRA includes four major requirements for facilities:

  1. Facility owners and operators must notify the state planning commissions if the facility contains extremely hazardous substances in excess of the threshold planning quantities specified in EPCRA.

  2. Facility owners and operators are required to immediately notify state and local emergency planning commissions of releases of hazardous substances in excess of reportable quantities.

  3. Facility owners and operators must submit Material Safety Data Sheets (MSDSs) or a list of MSDSs for hazardous chemicals or substances to emergency planning commissions and fire departments. The type, location, hazard, and amounts of material present must be reported.

4. Certain facility owners and operators must provide an annual report of all releases of toxic chemicals.

- Endangered Species Act - The Endangered Species Act provides for the designation and protection of wildlife, fish, and plant species that are in danger of becoming extinct and for preservation of the ecosystems on which such species depend. The requirements generally involve preparation and submittal of a biological assessment to identify any endangered or threatened species that are likely to be affected by a proposed action.

- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) - FIFRA establishes a product registration, labeling, and review process for all pesticides produced and distributed for use in the United States. Most parts of FIFRA mandate requirements for manufacturing, registering, selling, and distributing pesticides. In most cases, Rocky Flats' requirements would be limited to regulations for disposal and storage of pesticides and pesticide containers for application of restricted pesticides.

- Federal Land Policy Management Act - The Federal Land Policy Management Act establishes public land policy and guidelines for administering the land policy and provides for management, protection, development, and enhancement of public lands. If DOE needs to use, obtain, or develop federally owned lands, it must obtain permission from the Department of the Interior.

- Fish and Wildlife Coordination Act - The purpose of the Fish and Wildlife Coordination Act is to ensure that fish and wildlife resources receive equal consideration with other values in planning development projects that affect water resources. Federal agencies must consult with the U.S. Fish and Wildlife Service whenever an agency plans to conduct, license, or permit an activity involving impoundment, dispersion, deepening, control, or modification of a stream or body of water.

- Hazardous Materials Transportation Act (HMTA) - The principal objective of HMTA is to promote protection of human health, property, and the environment against the risks associated with transport of hazardous materials. The regulations promulgated under HMTA establish procedures for handling, packing, labeling, placarding, and routing hazardous material shipments.

  At Rocky Flats, waste management activities require routine shipment of materials covered by the HMTA (usually radioactive or mixed waste). It should be noted that a "hazardous material" under HMTA is not the same as a "hazardous waste" under RCRA. Transportation of hazardous materials/wastes resulting from remediation of a contaminated site also must comply with HMTA guidelines.

- Historic Sites Act - The Historic Sites Act provides for preservation of historic American buildings, objects, and antiquities of national significance.

- Medical Waste Tracking Act - This Act establishes requirements for packing, storage, transport, and disposal of medical wastes (cultures, stocks, human blood and blood by-products, and sharps).

- Migratory Bird Treaty Act - The Migratory Bird Treaty Act affords protection to many species of migratory birds by prohibiting hunting or possession of such species or their nests or eggs. Consultation with the U.S. Fish and Wildlife Service is required regarding impacts to migratory birds and methods to prevent or minimize these effects.

- National Historic Preservation Act - The National Historic Preservation Act requires that any federal agency, before undertaking any project, adopt measures to mitigate the potential adverse effects of that project on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places.

- National Trails System Act - The National Trails System Act establishes a system of recreational trails in order to provide a variety of outdoor recreation uses in or reasonably accessible to urban areas. Federal agencies must evaluate planned projects for impacts to established or proposed trails, including state and local trails of importance.

- Natural Resource Damage Assessment - The Natural Resource Damage Assessment is an optional rule under both CERCLA and the Clean Water Act and is required at Rocky Flats by DOE Order 5400.4(g). CERCLA and the Clean Water Act provide that agencies authorized to act as trustees for natural resources may assess damages from the discharge of hazardous materials and may seek to recover those damages. The process is initiated after a Record of Decision is signed. First, a pre-assessment screen is completed. If the pre-assessment screen indicates the need for an assessment, it is planned and carried out. Type A assessments are simplified assessments performed in coastal and marine environments. Type B assessments are more detailed and are performed in terrestrial and freshwater environments. Injuries to natural resources are determined, and damages based on those injuries are assessed. Finally, damages may be recovered by the trustees or by agreement.

- Noise Control Act - Although the Occupational Safety and Health Administration (OSHA) has primary responsibility for controlling most noise sources in the environment, EPA has been given statutory authority to oversee federal actions pertaining to noise pollution in general. The Noise Control Act provides for establishment of noise standards and regulation of noise emissions from products in commerce.

  Although it is not anticipated that any activity at Rocky Flats will produce ambient noise levels covered by the Noise Control Act, certain activities (such as construction) may require monitoring to demonstrate compliance with the spirit of the Act and with state and local noise abatement regulations.

- Occupational Safety and Health Act - OSHA requirements pertaining to hazardous waste operations and emergency response are set forth in Title 29 of the Code of Federal Regulations (CFR). OSHA requires that a safety and health program be developed and implemented for employees involved in hazardous waste operations. The program must include formal training for supervisors and employees who work at hazardous waste sites or treatment/storage/disposal facilities, including those involved in hazardous materials spill response.

  The Act does not apply to DOE facilities, as the Occupational Safety and Health Act specifically exempts federal agencies from its provisions. However, the standards and goals of OSHA are established at Rocky Flats primarily by DOE Orders 5480.1 and 5483.1A.

- Resource Conservation and Recovery Act - RCRA, promulgated in 1976, and amended by the Hazardous and Solid Waste Amendments (HSWA), regulates generation, storage, treatment, and disposal of hazardous wastes, including mixed wastes. The State of Colorado has been granted regulatory authority for RCRA activities under the state statute (Colorado Hazardous Waste Act) although EPA maintains the right to regulate RCRA activities. The state statute closely parallels the RCRA requirements set forth in 40 CFR Parts 260 through 268 but is somewhat different from the permitting requirements set forth in 40 CFR Part 270. RCRA Part B permits are issued by CDH. EPA and CDH have joint regulatory authority over Land Disposal Restricted materials and enforce HSWA requirements for these materials.

  RCRA and associated regulations drive many SSP activities related to program management, permit preparation, closure of inactive facilities that contain hazardous materials, waste storage, and waste treatment.

  On September 30, 1991, CDH issued a RCRA Part B permit for some facilities included in the site's Part B permit application for hazardous and low-level mixed waste.

- Safe Drinking Water Act - The purpose of this Act is to protect drinking water supplies by establishing contaminant limitations and enforcement procedures. The State of Colorado has also adopted regulations to implement this federal Act requiring that water supplies be monitored and that periodic reports be submitted to demonstrate compliance with applicable regulations. The State of Colorado has also adopted regulations governing subsurface emplacement of fluids by well injection.

  Requirements under the Safe Drinking Water Act consist of inspection, monitoring, recordkeeping, and reporting to demonstrate compliance with primary and secondary drinking water standards.

- Solid Waste Disposal Act - This Act and the Colorado Solid Wastes Disposal and Facilities Act set forth requirements for design, construction, operation, maintenance, and closure of solid waste landfills.

- Toxic Substances Control Act (TSCA) - TSCA establishes requirements to protect human health and the environment from unreasonable risks arising from the manufacture, distribution, use, or disposal of substances containing toxic chemicals. The principal sections of TSCA apply to the manufacture and distribution of new substances or new uses of existing substances and the use of asbestos in schools.

  The primary Rocky Flats compliance requirements pertain to the use, storage, marking, and disposal of polychlorinated biphenyls (PCBs) and to asbestos abatement projects. The principal contact with PCBs is through storage and disposal of discarded PCB transformers and capacitors.

- Underground Storage Tank (UST) Statutes - Federal and state UST statutes set forth requirements for design, construction, and operation of USTs used to store regulated materials (including petroleum-based lubricants and solvents). Materials identified as hazardous waste under RCRA are excluded from control under the UST regulations.

Executive Orders

- Executive Order 11990, Protection of Wetlands, states that all federal agencies must prevent, to the extent possible, the adverse impacts of destroying or modifying wetlands and must prevent direct or indirect support of new construction in wetlands if there is a practicable alternative. Compliance with this Order is most likely to be of concern during evaluation of the environmental impact of a pending decision or action.

DOE Orders

- DOE Order 3790.1A, Federal Employee Occupational Safety and Health Program - Provides for a safe work place for employees based on OSHA requirements.

- DOE Order 5400.1, General Environmental Protection Program - Establishes the DOE framework for compliance with applicable federal, state, and local environmental laws and regulations.

- DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program - Establishes policies and requirements for managing hazardous and mixed wastes and implements the requirements of RCRA within the DOE framework established by DOE Order 5400.1.

- DOE Order 5400.5, Radiation Protection of the Public and the Environment - Establishes standards and requirements for DOE and DOE contractor operations with respect to protection of members of the public and the environment against undue risk from radiation.

- DOE Order 5440.1D, National Environmental Policy Act - Establishes procedures to implement NEPA within the DOE.

- DOE Order 5700.6B, Quality Assurance - Provides DOE policy, sets forth requirements, and assigns responsibilities for establishing, implementing, and maintaining plans and actions to ensure quality achievement in DOE programs.

- DOE Order 5800.1, Research and Development Laboratory Transfer Program - Establishes policy and responsibilities for management of the DOE research and development laboratory technology transfer program.

- DOE Order 5820.2A, Radioactive Waste Management - Establishes policies, guidelines, and minimum requirements by which DOE manages its radioactive and mixed wastes. The SSP fulfills the Order's requirement for an annual site waste management plan.

Waste Acceptance Criteria

- Waste Isolation Pilot Plant - WIPP, located near Carlsbad, New Mexico, will accept TRU and TRU-mixed waste in accordance with the facility's waste acceptance criteria. Because Rocky Flats does not generate remote-handled TRU waste (RH-TRU), criteria for acceptance of RH-TRU do not apply. Packages generated for disposal at WIPP must meet the following WIPP criteria:

  - WIPP-DOE-069, TRU Waste Acceptance Criteria for WIPP

  - WIPP-DOE-114, TRU Waste Certification Compliance Requirements for Acceptance of Newly Generated Contact-Handled Wastes to be Shipped to WIPP

  - WIPP-DOE-120, Quality Assurance Requirements for Certification of TRU Waste for Shipment to WIPP

  - WIPP-DOE-137, TRU Waste Certification Compliance Requirements for Contact-Handled Wastes Received from Storage for Shipment to WIPP

  - WIPP-DOE-157, Data Package Format for Certified Transuranic Waste for WIPP

- Nevada Test Site Waste Acceptance Criteria - The waste acceptance criteria for the Nevada Test Site are presented in DOE-NVO-325, "Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements." The Nevada Test Site is currently approved for disposal of low-level radioactive waste. Nonradioactive hazardous waste and TRU-mixed waste will not be accepted for storage or disposal.

APPENDIX F

FISCAL YEAR 1993 FUNDING SUMMARY

FY93 Funding Summary

ACTIVITY DATA SHEET #	TITLE	FY93 FUNDS (in thousands)
Environmental Restoration		
1001	OU1 - 881 Hillside	1,769
1002	OU2 - 903 Pad, Mound, and East Trenches	8,416
1005	OU5 - Woman Creek	5,106
1006	OU8 - 700 Area	51
1007	OU12 - 400/800 Area	16
1008	OU13 - 100 Area	19
1009	OU16 - Low-Priority Sites	0
1010	OU14 - Radioactive Sites	67
1011	OU3 - Offsite Areas	2,707
1012	Sitewide Programs	15,388
1014	OU6 - Walnut Creek	9,500
1018	OU15 - Inside Building Closures	54
1231	OU10 - Other Outside Closures	0
1233	Program Management	7,314
1251	OU9 - Original Process Waste Lines (OPWL)	2,739
1255	OU7 - Present Landfill	7,977
1258	OU4 - Solar Evaporation Ponds	42,177
1261	OU11 - West Spray Field	2,032
1263	Oxnard Facility	0
1264	Offsite/Onsite Water Management	53,924
1271	Decontamination Facilities - Environmental Restoration	1,864
1272	Waste Handling/Treatment Facilities - Environmental Restoration	0
Subtotal Environmental Restoration		161,120

ACTIVITY DATA SHEET #	TITLE	FY93 FUNDS (in thousands)
Waste Management		
Program Management		
3031-1	Program Direction	1,344
3812	Program Control	45,194
	Compliance Program Management Waste & Environmental Data Management Program Support for Compliance Activity Waste Programs Procedures (includes Waste Management Program Support) Waste Quality Implementation & Maintenance Waste Management Engineering Project Management Waste Management Qualifications Waste Management Planning & Budgeting Waste Management Storage Programs Waste Management Program Integration Control Waste Management Assessment & Compliance (includes Waste Management Program Support) Residue Waste Management	
3813	Waste Minimization Planning	1,522
3814	Agreement in Principal (Colorado)	2,340
	Payments to State - Rocky Flats Payments to State - DOE Nevada Field Office Payments to State - Rocky Flats Permitting Fees	
3815	Payment to Local Communities	0

ACTIVITY DATA SHEET #	TITLE	FY93 FUNDS (in thousands)
Rocky Flats Plant		
3821	Facility Operations & Maintenance	57,964
	Work for Others Offsite Transportation/Disposal of Waste Saltcrete Disposal Waste Assay & Shipping Hazardous Waste Operation Waste Certification Liquid Waste Operations, Building 374 Liquid Waste Operations, Building 774 Solid Waste Operations, Protected Area (PA) Sewage Treatment Plant Operations Onsite Landfill Operations Implement Comprehensive Wastewater Management Plan	
3822	New Facility Planning	3,629
	Waste Processing Facility Waste Processing Facility, Outside PA Low-Level Mixed Waste Storage Facility Building 776 Upgrade Residue Elimination Project TRU Waste Operating Facility Building 889 Upgrade Sludge Immobilization System, Building 774 Supercompactor II	
3823	General Plant Projects	462
	Building 569 Addition	

ACTIVITY DATA SHEET #	TITLE	FY93 FUNDS (in thousands)
3826	Capital Projects	927
	Improve ASRF - Building 776 Nitrate Salt Immobilization, Building 374 Organic Process System, Building 776 Supercompaction & Repackaging Facility - Upgrade Waste Evaporation Renovation, Building 374 Steam Cleaning/Stripping Sludge Immobilization System, Building 776 Thermal Treatment Process Unit Polymer Solidification Waste Cementation Upgrades, Building 776 Pave Unit 10	
3827	Sewage Treatment Plant	200
3828	New Sanitary Landfill	1,000
3829	Building 374, Liquid Waste Treatment Facility Upgrade	3,134
Subtotal Waste Management		117,716

TECHNICAL TASK PLAN #	TITLE	FY93 FUNDS (in thousands)
Technology Development		
FFCA II Projects		
101201	Microwave Solidification	1,024
101202	Solidification Development for Sludges, Salts, and Ash	600
101205	Incineration Alternatives	2,000
111202	Thermal Treatment Process Unit	700
111203	Polymer Solidification	1,000
111204	Nitric Acid Recycle/Nitrate Destruction	1,000
111205	Analytical Characterization of Mixed Waste	850
121203	Investigation of Additional Technologies	154
121204	Surface Organic Contaminant Removal	800
Other Office of Technology Development Projects		
014101	Industrial Workshop - Technology Integration	100
025001	Technical Program Management Detailee	518
121205	Technology Investment Strategy	0
026001	Program Direction	465
121202	Technical Program Support	0
121101	Rocky Flats Plutonium in Soils Cleanup	490
121201	Mixed Waste Integrated Program Support	250
113201	Robotics Waste Minimization	115
104201	Science Education Outreach	328
114101	Colorado Center for Environmental Management	2,700
114102		
114103		
Subtotal Technology Development		$13,094

APPENDIX G

LIST OF ACRONYMS AND ABBREVIATIONS

LIST OF ACRONYMS AND ABBREVIATIONS

ACO	Administrative Compliance Order
ADS	Activity Data Sheet
AIP	Agreement in Principle
APEN	Air Pollution Emission Notice
AQMP	Air Quality Management Plan
ARARs	Applicable or Relevant and Appropriate Requirements
ASME	American Society of Mechanical Engineers
ASRF	Advanced Size Reduction Facility
ATSDR	Agency for Toxic Substances and Disease Registry
CAD	Corrective Action Decision
CDH	Colorado Department of Health
CEM	continuous emissions monitoring
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFCs	chlorofluorocarbon refrigerants
CHWA	Colorado Hazardous Waste Act
CMI	Corrective Measures Implementation
CMS	Corrective Measures Study
CTMP	Comprehensive Treatment and Management Plan
CWQCC	Colorado Water Quality Control Commission
CWSF	Central Waste Storage Facility
CX	categorical exclusion
DOE	U.S. Department of Energy
DOE-DP	DOE Defense Programs
DOE-EM	DOE Office of Environmental Management
DOE-HQ	DOE Headquarters
DOE-NVO	DOE Nevada Field Office
DOE-RFO	DOE Rocky Flats Office
DOT	U.S. Department of Transportation
E&WM	EG&G Environmental and Waste Management organization
EA	Environmental Assessment
EE	Environmental Evaluation
EIS	Environmental Impact Statement
EIS/ODIS	Effluent Information System/Onsite Discharge Information System
EPA	U.S. Environmental Protection Agency
ERM	EG&G Environmental Restoration Management organization
FBU	fluidized bed unit
FFCA	Federal Facilities Compliance Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
FS	Feasibility Study
FY	fiscal year
FYP	Five-Year Plan

g	gram(s)
GAC	granular activated carbon
GWMP	Ground Water Monitoring Program
HEPA	high-efficiency particulate air
HHRA	Human Health Risk Assessment
HSWA	Hazardous and Solid Waste Amendments
HVAC	heating, ventilating, and air conditioning
IAG	Interagency Agreement
IBC	Inside Building Closure
ICM	Interim Corrective Measure
ICM/IRA	Interim Corrective Measure/Interim Remedial Action
IHSS	Individual Hazardous Substance Site
INEL	Idaho National Engineering Laboratory
IRA	Interim Remedial Action
ITS	Interceptor Trench System
LANL	Los Alamos National Laboratory
LCO	Limiting Condition of Operations
LDR	Land Disposal Restricted
M&O	Management and Operating
MAP	Mitigation Action Plan
MRCP	Mixed Residue Compliance Plan
mrem	millirem
MSDS	Material Safety Data Sheet
NAAQS	National Ambient Air Quality Standards
nCi	nanocurie(s)
NDA	nondestructive assay
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NQA	Nuclear Quality Assurance
NRDA	Natural Resource Damage Assessment
OC	Outside Closure
OMB	Office of Management and Budget
OOC	Other Outside Closure
OPWL	Original Process Waste Lines
OU	operable unit
PA	Protected Area
PCBs	polychlorinated biphenyls
PEIS	Programmatic Environmental Impact Statement
PPCD	Plan for Prevention of Contaminant Dispersion
PSAR	Preliminary Safety Analysis Report
QAMS	Quality Assurance Management Staff (EPA)
QAPD	Quality Assurance Program Description
QAPjP	Quality Assurance Project Plan
QAPM	Quality Assurance Program Manager
QAPP	Quality Assurance Program Plan

QARD	Quality Assurance Requirements Document
RAAMP	Radioactive Ambient Air Monitoring Program
RCA	Settlement Agreement and Compliance Order on Consent #89-10-30-01
RCO	(Residue) Compliance Order 91-07-31-01
RCRA	Resource Conservation and Recovery Act
RDDT&E	Research, Demonstration, Development, Testing, and Evaluation
REP	Residue Elimination Project
RFEDS	Rocky Flats Environmental Data System
RFI/CMS	RCRA Facility Investigation/Corrective Measures Study
RFI	RCRA Facility Investigation
RH	remote handled
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTR	real-time radiography
SAP	sampling and analysis plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SARF	Supercompaction and Repackaging Facility
SOP	standard operating procedure
SRV	Size Reduction Vault
SSP	Site-Specific Plan
STP	Sewage Treatment Plant
SWEIS	Sitewide Environmental Impact Statement
SWMP	Surface Water Management Plan
TADS	Technical Activity Data Sheet
TCLP	Toxicity Characteristic Leaching Procedure
TD	Technology Development
TIS	Technology Investment Strategy
TPM	Technical Program Manager
TRU	transuranic
TSCA	Toxic Substances Control Act
TTP	Technical Task Plan
TTPU	thermal treatment processing unit
TWS	TRU Waste Shredder
UCNI	unclassified controlled nuclear information
UV	ultraviolet
VOC	volatile organic compound
WA&S	Waste Assay and Shipping
WARP	Well Abandonment and Replacement Program
WEMS	Waste and Environmental Management System
WIPP	Waste Isolation Pilot Plant
WSE	Waste System Evaporator
WSRIC	Waste Stream and Residue Identification and Characterization

APPENDIX H

GLOSSARY

GLOSSARY

acid	A chemical compound that yields hydrogen ions when dissolved in water
actinide	Any of a series of chemically similar, mostly synthetic radioactive elements with atomic numbers ranging from 89 (actinium) through 103 (lawrencium)
AIR-DOS	An EPA computer model used for modeling the atmospheric dispersion of radionuclides
alluvial	Consisting of earth, sand, gravel, or other rock or mineral materials transported by and laid down by flowing water
alluvium	Sediment deposited by flowing water, as in a river bed, flood plain, or delta
ambient	Surrounding or encircling
aqueous	Pertaining to, similar to, containing, or dissolved in water, or formed from matter deposited by water
assay	The weight (%) of nuclear material in a given item
Base Programs	Environmental and waste management programs that are ongoing and are necessary for day-to-day operation of Rocky Flats. Base Programs activities are funded by DOE-DP.
baseline	A time-phased budget plan against which performance is measured
bedrock	Solid rock that underlies all soil, sand, clay, gravel, and loose material on the earth's surface
bench scale	A mock-up or small-scale design of a plant or process
berm	A narrow ledge or shelf along a slope
beryllium (Be)	A lightweight, corrosion-resistant, rigid, steel-gray metallic element with a high melting point
bias	(1) The difference between the expected value of an estimator and the true value being estimated; or (2) a persistent or systematic error that remains constant over a series of replicated measurements
biodenitrification	The anaerobic biological reduction of nitrates to nitrogen gas
biota	The animal and plant life of a particular region considered as a total ecological entity
caustic	Capable of burning, corroding, or dissolving by chemical action

centrifuge	An apparatus consisting essentially of a compartment spun about a central axis to separate contained materials of different densities
characterization	Description of the properties or attributes of an item, process, or service
compliance	Act of complying with rules, regulations, or orders
curie (Ci)	A unit of radioactivity, the amount of any nuclide that undergoes exactly 37 billion radioactive disintegrations per second (CI)
decommission	Take out of service, as in a nuclear plant or facility
decontamination	Reduction or removal of contaminating radioactive material from a structure, area, object, or person; may be accomplished by treating the surface to remove or decrease the contamination
effluent	An outflow or discharge of waste, as from a sewer
electrolysis	Chemical change, especially decomposition, produced in conducting solution by an electric current
Environmental Assessment (EA)	A detailed statement prepared by an organization for its own use to appraise the effect of a proposed project on the aggregate of social and physical conditions that influence a community or ecosystem
Environmental Impact Statement (EIS)	A document prepared by industry or a political entity on the environmental impact of its proposals for legislation and other major actions significantly affecting the quality of the human environment; used as a tool for decision making and required by NEPA
EPA QAMS-005/80	EPA Quality Assurance Management Staff document, Interim Guidelines and Specifications for Quality Assurance Project Plans
extrusion	The application of pressure to a billet of metals, forcing the metal to flow through a die orifice to produce desirable shapes and characteristics of the piece
fissile	Materials that can spontaneously fracture into lighter elements, releasing tremendous energy
flocculation	The process by which clumps of solids in water or sewage are made to increase in size by biological or chemical action so that they can be separated from the water
French drain	A water drainage technique consisting of a perforated pipe surrounded by gravel drain rock

fugitive emission	An emission that could not reasonably pass through a stack, chimney, vent, or other functional equipment opening
geologic	Pertaining to or related to geology, the study of the planet Earth, the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin
glovebox	A gas-tight enclosure having openings fitted with gloves, with which certain radioactive or other special materials can be safely handled
groundwater	Water beneath the earth's surface between saturated soil and rock that supplies wells and springs
gypsum	A white mineral used in the manufacture of Portland cement
halogenated	Chemically bonded with one of the halogen elements (bromine, fluorine, chlorine, iodine, and astatine)
hydrocyclone	Equipment that uses centrifugal force to separate particles in a solution by size
hydrogeologic	Relating to subsurface waters and related geologic aspects of surface waters
in situ	In the original place (e.g., remediation or monitoring that occurs in place rather than collecting material for offsite treatment or analysis
inert	Exhibiting no chemical activity; totally unreactive
influent	Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant
inorganic	Not composed of organic matter
interceptor trench	A trench designed to intercept or divert the flow of groundwater and/or surface water
interim	An interval of time between one event, process, or period and another
isokinetic sampling	Sampling in which the linear velocity of the gas entering the sampling nozzle is equal to that of the undisturbed gas stream at the sampling point
isotope	Atoms/species of an element having the same atomic number/ chemical element but different atomic weights

Joule melter	The melting process in which the heat generated by electrical resistance is used to melt waste and glass-formers into a very stable glass matrix; inorganic and metallic constituents are trapped within the matrix, and organic constituents are destroyed
Land Disposal Restricted (LDR)	Restricted land disposal of certain hazardous wastes, unless the wastes are treated or unless it can be demonstrated that there will be no migration as long as the waste remains hazardous
leachate	Liquid that results from water collecting contaminants as it trickles through waste materials
leaching	Removal of soluble constituents by the action of a percolating liquid
nanocurie (nCi)	One billionth part of a curie
NQA-1	Nuclear Quality Assurance Level 1, "Quality Assurance Program Requirements for Nuclear Facilities," promulgated by the American Society for Mechanical Engineers, to provide additional interpretive guidance for development and implementation of quality assurance programs
nuclide	A general term referring to all known isotopes, both stable and unstable, of the chemical elements
off-gas	Gases, vapors, and fumes produced as a process
organic	(1) Pertaining to, or derived from, a living organism; or (2) in chemistry, any compound containing carbon
pilot scale	A prototype or first run of a plant or process before full-scale production
pondcrete	Pond sludge that has been solidified with cement
post closure	The time period following the shutdown of a waste management or manufacturing facility (for monitoring purposes, this is often considered to be 30 years)
precipitate	To cause a solid substance to be separated from a solution
promulgate	To put a law into effect by formal public announcement
pyrolysis	Chemical change caused by heat
radioisotope	An unstable isotope of an element that decays or disintegrates spontaneously, emitting radiation
radionuclide	A radioactive nuclide

Raschig rings	Small cylindrical rings fabricated from inert materials that are used at Rocky Flats for preventing criticality in tanks storing radioactive materials
real time	Pertaining to the performance of a computer computation during the actual time that the related physical process takes place, in order that results of the computation can be used in guiding the physical process
Remedial Investigation	An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site, establish criteria for cleaning up the site, identify preliminary alternatives for remedial actions, and support technical and cost analysis of the alternatives
residues	Process by-products that contain amounts of actinides considered economically recoverable at the time of their generation
resource loaded	In scheduling, linking resources (personnel, dollars, etc.) to actual activities within a schedule
saltcrete	A low-level mixed waste form originating from the process wastewater evaporation system in Building 374
seismic	Subject to, or caused by, an earthquake or earth vibration
slurry wall	A wall made of a thin mixture of a liquid, usually water, and any of several finely divided substances (such as cement, plaster of Paris, or clay particles)
stewardship	Management or oversight of a facility or the environment
Superfund	Alternate term used for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
surface water	All waters on the surface of the Earth, including fresh water, salt water, ice, and snow
telemetry	A method for determining the distance of an object remote from the observer
throughput	Output or production, as of waste treatment process, over a period of time
Tiger Team Audit	A special assignment team dispatched by the Secretary of Energy in June 1989 to evaluate Rocky Flats operations and practices and recommend corrective actions

transuranic element	An element above uranium in the periodic table (i.e., with an atomic number greater than 92); all 11 known transuranic elements are radioactive and produced artificially (e.g., curium, lawrencium, and plutonium)
turbidity	The property of a liquid that is muddy or cloudy as a result of the disturbance of sediments
vadose	The zone of aeration in soils that contains water under pressure less than that of the atmosphere
volatile	Description of any substance that evaporates readily at a relatively low temperature